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of the
American Veterinary Medical Association

FORMERLY

AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Assn.)

EDITED AND PUBLISHED FOR

The American Veterinary Medical Association

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(Original Official Organ U. S. Vet. Med. Ass'n.)

H. Preston Hoskins, Secretary-Editor, 735 Book Building, Detroit, Mich.

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AN APPRECIATION OF VETERINARY SERVICE

On another page of this issue we are reprinting an editorial, entitled "The Loss From Animal Diseases is Diminishing," from *The Weekly Kansas City Star*, of June 6, 1923, a publication having a circulation of 360,000. This splendid tribute to the value of veterinary service was written by Dr. H. J. Waters, the Managing Editor. We wish that it might be read by every farmer and breeder in the country.

Dr. Waters was formerly Dean of the Agricultural Department of the University of Missouri, later President of the Kansas State Agricultural College, which post he left to take up his present connection with the Weekly Kansas City Star. In all of these positions Dr. Waters has had many opportunities to become acquainted with members of the veterinary profession and their activities. It is only too evident that he has been favorably impressed and fully appreciates the true worth of competent veterinary service.

But Dr. Waters' acquaintance with veterinarians and their work had even an earlier beginning than as mentioned above. Many years ago, as a student, in the agricultural course at the University of Missouri, then later as assistant to the Dean, in the administration of the work of the college farm, Dr. Waters came

in contact with Dr. Paul Paquin, then Professor of Veterinary Science. Dr. Paquin was a graduate of the Veterinary Department of McGill University and later pursued courses of study in French bacteriological laboratories, while Pasteur was yet alive and so potent a factor in stimulating and fostering such studies.

Another man with whom Dr. Waters came in early contact was the late Dr. Leonard Pearson, Dean of the Veterinary School of the University of Pennsylvania. The two men were brought together quite intimately while Dr. Waters was Professor of Agriculture at the Pennsylvania State College. A very warm friendship for each other developed between them, kindled through the admiration the one had for the other, mutually interested as they were in live stock production and conservation, or, as it pleased Dr. Pearson to call it—animal engineering.

On many occasions Dr. Waters has shown his deep appreciation of the high value of the unselfish efforts of the veterinary profession. It is indeed fortunate that the foundations for Dr. Waters' friendship for the veterinarian were so well laid, through his acquaintance with the work and the ideals of such sterling representatives of the profession as Paquin and Pearson. There are other, present-day veterinarians, (Connoway, of Missouri, and Dykstra, of Kansas, are conspicuous examples), who have made their impress on Dr. Waters, during more recent years, and it is to be hoped that we will continue to deserve and to enjoy the confidence placed in us by such outstanding men as Dr. Waters.

AS OTHERS SEE US

In a recent issue of *The Breeders' Gazette* there was an editorial entitled "Work for Veterinarians." The writer of this very timely and appropriate editorial is evidently well posted on conditions in the veterinary profession at the present time. The writer tells the stockman very plainly that competent veterinary services are too frequently undervalued and their worth too poorly appreciated. He says:

> "A number of veterinary inquiries come to us from breeders and stockmen living in communities in which there are no "graduate veterinarians" to consult. Some of the practicing members of this profession are not adequately trained in veterinary science, as it is taught today in the best institutions.
>
> "We are not indicting a profession: veterinarians as a class are probably as competent and conscientious as any other class of professional men. We are merely pointing out that in some communities stockmen either

do not have access to the best grade of veterinary talent or are compelled to patronize practitioners whose qualifications are technically meagre.

"Every stockraising community, however, has as efficient a veterinarian as it will support; if it demanded a better-trained man, it would have him, although there is a shortage of highly-trained veterinarians. 'There is a reason': it is that veterinary service has not been sufficiently recognized and rewarded in this country to induce many young men of the best grade to educate themselves for the profession. Some of those who have engaged in it are not properly educated for the increasingly difficult work which they are called upon to do.

"Stockmen are largely responsible not only for what patently is a low grade of veterinary service, in some regions and instances, but for America's shortage of veterinarians who are fully qualified for the highest grade of professional work."

A suggestion is offered for developing the "community veterinarian" idea. A full appreciation is expressed of the greater value of prevention of disease, as against curing disease that has been allowed to develop. We have often wondered why somebody did not try the idea herein expressed. Perhaps it borders too closely on state medicine. The greatest draw-back, as we see it, is that no veterinarian will want to do the "drudgery" of routine practice, or the part that is left after the cream has been skimmed off by the community veterinarian under contract. That is the condition which partially exists now, and to which our practitioners are objecting, in those states where Federal and State veterinarians are doing most of the tuberculin testing.

"The Gazette's opinion is that many an established, organized stockraising community could well afford to employ a well-trained veterinarian by the year. His business would be to instruct and advise breeders in regard to animal hygiene and sanitation; to assist them in keeping their herds, flocks and studs healthy; to conduct tests, administer vaccines, biologics and treatment, when necessary; to certify to the health and sexual soundness of stock offered and sold; to act for breeders in all matters involving state and Federal regulations. As a live stock sanitarian, specializing in work designed to keep stock healthy, he would be worth much more to his employers than he could earn by treating developed cases of disease. The prevention of diseases is more economical and important than treating them. When communities in which stockraising is an established adjunct to farming begin employing or feeing graduate veterinarians for this kind of service, the "crop" of men qualified to serve the industry in accordance with modern veterinary science and practice will automatically increase.

"The future development, stability and practical value of the improved live stock industry will, to a greater extent than in the past, depend upon clean bills of animal health, vouched for by owners and veterinarians, and confidently accepted by purchasers. The selling of diseased or sterile animals for breeding purposes, whether it be a deliberate practice of the unscrupulous or an act of ignorant innocence, must cease. We are pleased to add that in recent years it has made reassuring progress toward cessation. It has long been outlawed by the conscience of the rank and file of breeders. The necessary next step is for breeders to place themselves in a position to issue clean bills of animal health, based upon a responsible, competent, veterinary service".

As a matter of fact, no territory having valuable live stock will be without competent veterinary services very long. On

the other hand, there are considerable areas, containing insufficient live stock to afford a veterinarian a decent living. It is usually from such territories that our farm papers receive the majority of their veterinary inquiries, mentioned in the opening paragraph of the editorial quoted. Very few such inquiries come from territories enjoying competent veterinary service.

Plan To Go To Montreal, August 27-31.

GET A NEW MEMBER

The 1923 membership campaign is under way. There never was a time when organization was so sorely needed by the veterinary profession. Every other force is organized. To call attention to the spread of "farmer vaccination" is simply directing attention to the results of organization. The farmers are organized. We do not say *well* organized. Many there are who doubt the solidity or the permanence of the present form of their organization. But the fact remains, they are organized.

So it behooves all forward-looking veterinarians to lend their support to our national organization. What is asked of each individual is small enough, indeed, but the sum total of our combined support can be productive of an enormous amount of good. There is not the slightest reason to think that the efforts of our Association will not be well directed in the future. While things were going well, we perhaps were too easily contented with what was accomplished in the past.

We are on the threshold of a new day. We are going to do things never attempted before. The report of the Committee on Policy, which will be presented to the members at Montreal, will contain a great many recommendations. To carry out the activities suggested in this report will require considerable money, more than is represented in the income of the Association, in the form of dues from our present membership. There is but one logical solution—a larger membership—which means a larger income.

Get in touch with the Resident Secretary of your State. Cooperate with him and give him all possible assistance in getting new members into the fold. We have prepared some mighty fine letters for some of our resident secretaries to send to their prospects. But these letters, as splendid as they are, will not accomplish the maximum in the way of results, unless they are

supplemented with a little personal touch. Call on your brother practitioner, who is not a member. Sell him on the merits of our national organization. Get him in. We need him. He needs us, too.

Have You Secured One New Member This Year?

VITAMIN THERAPY

Vitamin therapy, if such term may be used, now seems to be suffering the penalties of unrestrained, commercial exploitation. This is probably more manifest in human practice than in veterinary practice, as the fad received a greater impetus among people than animals.

Today, the greatest interest seems to be centered around the possibilities of yeast therapy, and whether vitamin B, in the form of yeast, will do the things which are being claimed for it. The protocols of certain experiments, upon which certain present claims are being made, would suggest that these experiments had not been conducted over a sufficiently long period of time.

Some claims are being made that yeast is a food. This is stretching the truth and no thinking individual should go astray on this score. Yeast has been used in veterinary medicine for a long time. It was used before we had nuclein, and when we became acquainted with nuclein, together with its therapeutic properties, credit was given to the nuclein in the yeast, for whatever good the latter accomplished.

There is no denying the fact that vitamins exist, and that the absence of one or more of them from the diet, for any length of time will be followed by disturbed metabolism, in certain genera of animals, at least. Some animals can apparently thrive without all the vitamins being present in the diet. Possibly these animals may have the power to synthesize these vitamins, although it has been believed that this takes place only in the vegetable kingdom.

What is needed most at the present time, is a comprehensive investigation to determine, if possible, whether there are vitamin-deficiency diseases among our animals, and if so, how extensive are these diseases. We must guard against the natural, present-day tendency to call every new condition a deficiency disease, until we know the exact nature of it.

Next, it should be determined whether such deficiency diseases

can best be treated by supplying the missing factors, (a) in the form of a natural food, (b) in the form of yeast (if it is vitamin B that is lacking), or (c) in scientifically prepared vitamin extracts, containing either single vitamins, or all known varieties in a balanced combination. We hope that somebody will undertake such an investigation.

We Want 5000 Members This Year.

FORD RIDES, BUT NOT ON WHEELS

A Detroit paper recently published, on the same page, two articles concerning Henry Ford. In one the flivver magnate was credited with having made the following statement: "The world is on wheels and will never get off." In the other article, which had to deal with Mr. Ford's aspirations for the presidency, the Detroit wizard showed a willingness to talk on almost any other subject, and among other things said: "I feel fine this morning. I arose early and rode horseback from 6 to 7."

These two rather conflicting statements prompt us to remark that we are pleased to note that Mr. Ford still knows how to get real enjoyment and healthful exercise, simultaneously, but we must take issue with him when he says that the world is to remain indefinitely on wheels. Mr. Ford may have hobbies, but we doubt if it was a hobby-horse that he was riding, between 6 and 7, on the morning of May 29th. He usually demands something with a little more action.

Does Your Wife Know About The Women's Auxiliary?

THE FUNCTION OF OUR JOURNAL

To establish and maintain ethical standards for American veterinary literature, which may be taken as a standard for veterinary literature the world over; and at the same time to cultivate the tastes of our members for the right kind of veterinary literature, as exemplified by the articles, discussions and reports published in these pages.

To serve as an accurate chronicle for current events in and pertaining to the veterinary profession, to the end that a reliable record of such events be left for the generations that will come after we have passed on. Let us strive to make this record always one of veterinary progress.

To direct attention, if and when necessary, to any conditions in our own midst, which need correction; not in the spirit of muck-raking or mud-slinging, but with the sole purpose of bringing about a cure for the condition, and that right early, before the cancer shall destroy us, or even impair any part of our structure.

To serve as a forum for the discussion, always in a scholarly and dignified way, of the problems with which the members of our profession find themselves continually confronted, and for which it is hoped that solutions may be obtained through the exchange of opinions.

To provide a sufficient variety of reading matter, so that there will always be something to attract and hold the interest of every member, regardless of the branch of the profession in which he may be engaged.

Have You Secured One New Member This Year?

MONTREAL TO BREAK ALL RECORDS

Indications point to a record attendance at the "Diamond Jubilee" meeting of the A. V. M. A., Montreal, August 27-28-29-30-31. Requests for reservations of rooms at the Mount Royal Hotel are pouring in. If you do not wish to be disappointed in this respect, do not delay writing for your reservation.

The program is taking form. The section officers report their sectional programs practically complete. The Local Committee on Arrangements is holding frequent meetings. A number of sub-committees have been appointed to look after the many details which are so essential to have everything run smoothly.

One whole day (Wednesday) has been set aside for a clinic, sectional in character and designed to interest all branches of the profession, it being felt that the policy inaugurated last year at St. Louis, offering special inducements to general practitioners, should be continued. Otherwise the convention is liable to turn into a mere holiday, or a "paper-presentation ceremony," with the majority of the members making themselves comfortable on the home veranda, in anticipation of the pleasure they will have at digesting the scientific side of the whole program in the JOURNAL.

The evening of the clinic day will see the gathering of the members at the memorable banquet (the first since Columbus,

in 1920), to be given at the Mount Royal Hotel. The members of the Committee are so sanguine in their hope that the banquet will be a huge success that it has also been decided to make the following day a "light" one, with a recess of a few hours—another innovation—before the motor- and boat-ride, which will take the members around the island of Montreal and down the world renowned Lachine Rapids, as guests of the City of Montreal.

The convention proper will assume an international aspect with at least three European delegates, who will take an active part in the program, and, as already announced, Sir Stewart Stockman, of Edinburgh, has consented to be present, while the latest news at hand is that Sir Arnold Theiler, C. M. G., of Pretoria, Transvaal, Director of Education and Research of South Africa, will be present and will contribute to make the meeting a beneficial one for all the members.

The delegate from France is expected to be appointed soon, by the French Government, and his name is eagerly awaited by those who have been in touch with the progress of modern veterinary science on the other side of the ocean.

As a celebration of the "Diamond Jubilee" of the Association, the convention will, in some respects, be unique, and certainly most interesting throughout. It should be a real appropriate "sparkling" event, to watch the leading lights in their own fields of Great Britain, France, South Africa, the United States and Canada, compare their experiences and hear each tell the why and the wherefore of his own distinctive policy.

Members of the Association who desire information of any nature, in connection with their intended visit to Montreal, will receive prompt replies from the Secretary of the Local Committee, Dr. J. H. Villeneuve, 200 West Dorchester Street, Montreal.

J.H.V.

Plan To Go To Montreal, August 27-31.

CONTINUING OUR HALL OF FAME

Dr. John E. Wurm, who has just completed a term of office as President of the Michigan State Veterinary Medical Association, is a "big" veterinarian in more ways than one. He is big physically, but he is also big mentally, professionally, politically and commercially, as the following brief biographical sketch will show.

Born on a farm, near Ubly, Michigan, November 19, 1878, he

has been agriculturally inclined all his life. He runs a stock farm in connection with his various other pursuits, and specializes in the breeding of Shorthorn cattle.

He attended the common schools of his district, and entered the Ontario Veterinary College. He "put himself through" and graduated in 1902. He immediately located in Elkton, Mich., and established a practice there. In 1909 he removed to Pigeon, Mich., where he has been ever since, very much of a fixture and a large part of Pigeon.

For eight years he was a member of the Common Council of the village of Pigeon. Then he was promoted to President and

DR. JOHN E. WURM

served two terms. He has Republican leanings, and during the War was Chairman of the War Board of Pigeon. He is secretary-treasurer of a number of commercial enterprises in Huron County. He is a Mason and Shriner.

Dr. Wurm is an active association worker. He believes in organization. He believes in playing fair. The value of his sterling qualities in these respects was brought out in the recent fight in the Michigan Legislature, when an attempt was made to "put over" farmer vaccination in the Wolverine State. It is

largely to Dr. Wurm's leadership and his ability to organize and direct his fighting forces, that this iniquitous piece of legislation was defeated. And, best of all, the fight was fought fairly, as attested by one who was desirous of having the bill pass.

Dr. Wurm is a busy practitioner. He has a very large and lucrative practice. One of the main reasons why he has been able to build up such a practice is because he is always interested in his clients' welfare, always ready to serve, and always willing to help. He has an in-born love for animals, which must be a part of a veterinarian's equipment, if he is to be successful as a general practitioner.

To prove further that Dr. Wurm is perfectly human, it might be added that he is an enthusiastic fisherman. Every year he steals away to the trout-streams of Northern Michigan. He has a summer cottage at Bay Port, where he frequently entertains his friends, particularly those who are piscatorially inclined.

Dr. Wurm has been a member of the American Veterinary Medical Association since 1910. He and Mrs. Wurm have attended quite a few of the meetings. They are planning to go to Montreal, "with the crowd." We almost forgot to mention that Dr. Wurm is Resident Secretary for Michigan this year and is now in the midst of an active campaign for new members. He is never too busy to lend a hand in any worthy undertaking.

We want to hear of more men of this type. We now have Welch, of Illinois; Faust, of New York; Lowe, of New Jersey; Haines, of Pennsylvania; and Wurm, of Michigan. Who is next?

We Want 5000 Members This Year.

EXECUTIVE BOARD ELECTIONS

The polls for the election of members of the Executive Board, for Districts Nos. 2 and 3, are closed and a count of the ballots cast indicates the re-election of Dr. T. E. Munce, of Harrisburg, Pa., in District No. 2, and the election of Dr. David S. White, of Columbus, Ohio, in District No. 3, to succeed Dr. S. E. Bennett, of Chicago, Ill., whose term of office will expire at the close of the meeting in Montreal. The count of the ballots was as follows:

DISTRICT NO. 2

T. E. Munce	210
Adolph Eichhorn	49

J. F. DeVine..... 36
Robert S. MacKeller..... 34
Wm. Herbert Lowe..... 15

DISTRICT NO. 3

David S. White.....106
L. A. Merillat..... 77
S. Brenton..... 52
T. H. Ferguson..... 44
E. L. Quitman..... 34
Reuben Hilty..... 26

Does Your Wife Know About The Women's Auxiliary?

THOMAS EDWARD MUNCE

Dr. T. E. Munce, who has just been re-elected as member of the Executive Board, for District No. 2, was born on a farm in Washington County, Pennsylvania, April 26, 1877. At the age of twelve years his parents moved to Washington, where he completed the public school course and attended Washington and Jefferson College. With a brother he returned to the farm and for five years engaged in the breeding and raising of pure bred cattle, sheep and swine.

After completing his preliminary education he entered the School of Veterinary Medicine, University of Pennsylvania, graduating with the class of 1904. Following three years of general practice Dr. Munce took up livestock regulatory work, being appointed an agent of the Bureau of Animal Industry, Pennsylvania Department of Agriculture, July 1, 1907.

His advancement in the veterinary profession has been rapid. Starting as a field veterinarian he gradually advanced until he was appointed, by the Governor, Deputy State Veterinarian in 1909 and State Veterinarian in 1919, the position which he now holds. He has seen the Pennsylvania Bureau of Animal Industry grow from a personnel of eleven to nearly one hundred and is the senior member of the force in years of service. Through the leadership of Dr. Munce, his Bureau has become the largest one in the Pennsylvania Department of Agriculture.

In addition to his numerous duties as Director of the Bureau of Animal Industry, Dr. Munce has been closely and actively identified with the veterinary profession and its activities throughout the United States. He organized the first local veterinary

club in Pennsylvania and has been intimately associated with the organization of the twelve others which have since been formed. He is past President of the Pennsylvania State Veterinary Medical Association, also of the United States Live Stock Sanitary Association.

In the year of his graduation Dr. Munce became a member of the American Veterinary Medical Association and has ever since, as a member and officer of the Association, been an indefatigable worker. For several years he has advocated a working policy for the A. V. M. A. He was the author and sponsor of the resolution recently adopted by the Executive Board which provided for the

DR. T. E. MUNCE

appointing of a special committee to draft such a policy for the Association, and was made Chairman of that Committee.

Dr. Munce has not confined his interests solely to the veterinary profession. He believes that the welfare of his profession can be best served by being affiliated with those organizations which tend toward the advancement of his immediate community and the betterment of the country at large.

It is with pride that he points to his membership in the Harrisburg Rotary Club, in which organization he is identificed with the "Big Brother" movement, the Chamber of Commerce and

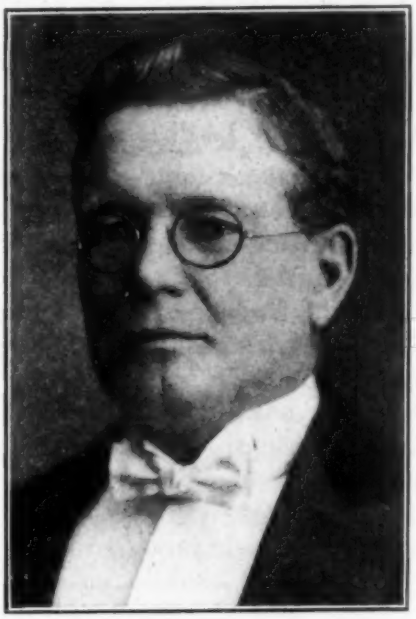
the Harrisburg Motor Club. He is a bank director and is also interested in church affairs.

Dr. Munce never overlooks the opportunity to impress upon his fellow veterinarians their responsibilities and the part they should play in the economic, social and religious activities of their respective communities.

Have You Secured One New Member This Year?

DAVID STUART WHITE

Any introduction to Dr. David S. White, member-elect of the Executive Board for District No. 3, is highly superfluous. It is such a short time since Dr. White served the Association as President, that the memory of his executive ability is still fresh in the minds of our members.



DR. DAVID S. WHITE

It is as a veterinary educator that Dr. White has cut his deepest notch. Today he enjoys the distinction of being the oldest full-time veterinary teacher, from the standpoint of years of continuous service, on any veterinary faculty in America. This year he rounds out his thirtieth year as a member of the faculty of Ohio State University.

In electing Dr. White to the Executive Board, the veterinarians of District No. 3 have placed him in a position where he can help to direct the policies of the Association along certain lines he advocated while President. It used to be a custom, in the Association, for the outgoing President to be made chairman of the Executive Board, so that he might further any policies, started as President, and otherwise cut short by his relinquishment of the office.

A full biographical sketch of Dr. White's career appeared in the JOURNAL, October, 1920, just after he was elected President of the Association. For fuller details of this useful career we refer our readers to that sketch. Suffice it to say here, that "Davey" (the fond sobriquet used by those who know him best) richly deserves his new honor. Few there are who may point to a cleaner record as a serious student, a practical veterinarian, a thorough teacher, an able writer and a good soldier.

Plan To Go To Montreal, August 27-31.

GET YOUR LAPEL EMBLEM

If we are obliged to take a large number of lapel emblems to Montreal, it will be necessary to pay duty on them. This can be avoided by our members getting their emblems in advance. If you are going to Montreal (pretty nearly everybody we have asked, thus far, says he is going), secure your emblem before you go. If it is not convenient for you to secure a postal money order for fifty cents, drop us a line and ask us to mail you an emblem, charging it to your account. You can pay for it when you pay your dues for next year. Better still, pay these dues *now*. They become due September first. Twenty-five members have already paid their dues one year in advance. Yes, it is a good sign. Things are improving right along.

We Want 5000 Members This Year.

ADDRESS YOUR MAIL CORRECTLY

During the past few months a great many letters sent us have been delayed in delivery, owing to the fact that they were insufficiently addressed. Many of these letters contained remittances. Others were of equal importance for other reasons. We have received mail, intended for the JOURNAL, that have been

forwarded from every place where the JOURNAL was ever published, including New York City, Ithaca, N. Y., Baton Rouge, La., and Washington, D. C. Former Secretary Dr. N. S. Mayo, continues to receive many letters intended for this office. We have but one address:

735 BOOK BUILDING, DETROIT, MICHIGAN

Address your mail accordingly, if you please!

Does Your Wife Know About The Women's Auxiliary?

WELL BALANCED PROGRAM FOR MINNESOTA MEETING

Secretary Fitch has arranged a splendid program for the 25th semi-annual meeting of the Minnesota State Veterinary Medical Association and Short Course, to be held at University Farm, St. Paul, Minn., July 18-19, 1923. There will be three sessions on the first day (Wednesday) and two on the second (Thursday). Among the subjects which will receive attention are: Ovariectomy in the cow, impaction of the rumen, circulatory stimulants, small, animal anesthesia, poultry diseases, vaginal prolapse, azoturia-caponizing, swine diseases, stricture and atresia of the udder, case reports, horse talks, etc. Those who will take part in the program, from out of the State, include Dr. H. E. Bemis, of Ames, Iowa; Mr. Wayne Dinsmore, Chicago, Ill.; Mr. W. S. Corsa, of Whitehall, Ill.; Dr. John Patterson, of Hedrick, Iowa; and Dr. L. Van Es, of Lincoln, Nebr.

Have You Secured One New Member This Year?

TO THE LADIES OF CANADA

Greetings!

The members of the Women's Auxiliary of the A. V. M. A. salute you! We are looking forward with much pleasure to meeting with you. We hope you may like us and become interested in our work. One of your own young men has applied to us for financial assistance from our loan fund. This should insure your interest and cooperation. We hope that many of you will become members this year. Let us all work together to make this the greatest meeting in our history.

D. I. L.

COMING VETERINARY MEETINGS

Oklahoma State Veterinary Medical Association. Medicine Park, Okla. July 9-10, 1923. Dr. L. B. Barber, Secretary, Live Stock Exchange Bldg., Oklahoma City, Okla.

Illinois State Veterinary Medical Association and Fourth Annual Veterinary Conference. Urbana, Ill. July 10-11-12, 1923. Dr. L. A. Merrilat, Secretary, 4753 Grand Boulevard, Chicago, Ill.

Western New York Veterinary Medical Association. Dr. Anderson Croforth's Hospital, 180 Walnut St., Lockport, N. Y. July 12, 1923. Dr. F. F. Fehr, Secretary, 243 So. Elmwood Ave., Buffalo, N. Y.

New Jersey, Veterinary Medical Association of. Hotel Marlborough, Asbury Park, N. J. July 12-13, 1923. Dr. P. B. Silvester, Secretary, Princeton, N. J.

Virginia State Veterinary Medical Association. Ocean View, Va. July 12-13, 1923. Dr. Geo. C. Faville, Secretary, Hampton, Va.

Minnesota State Veterinary Medical Association. University Farm, St. Paul, Minn. July 18-19, 1923. Dr. C. P. Fitch, Secretary, University Farm, St. Paul, Minn.

Missouri Valley Veterinary Association. Omaha, Nebr. July 23-24-25, 1923. Dr. E. R. Steel, Secretary, Grundy Center, Iowa.

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American Veterinary Medical Association. Mount Royal Hotel, Montreal, Canada. August 27-28-29-30-31, 1923. Dr. H. Preston Hoskins, Secretary, 735 Book Bldg., Detroit, Mich.

Plan To Go To Montreal, August 27-31.

STUDIES IN COMPLEMENT FIXATION IN BOVINE TUBERCULOSIS[1]

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I. THE INFLUENCE OF HEATING SERA AND THE KIND AND DURATION OF PRIMARY INCUBATION UPON THE OCCURRENCE OF SPECIFIC AND NON-SPECIFIC TUBERCULOSIS COMPLEMENT FIXATION TESTS WITH CATTLE SERA.

INTRODUCTION

While tuberculosis of human beings was one of the first diseases in which the complement fixation test was applied, the results were so largely of a negative character that the matter attracted but little attention. Within recent years, however, interest in the subject has been renewed and a rather large literature has accumulated insofar as complement fixation in human tuberculosis is concerned.

An analysis of this literature shows quite a difference of opinion on the occurrence, specificity and practical diagnostic value of the reaction in human tuberculosis. Some investigators have reported most favorably in that the reactions were found highly specific, very sensitive and a reliable index of the presence of active tuberculosis with special reference to tuberculosis of the lungs. Other investigators have not been able to substantiate these results, reporting that while positive reactions may occur, the degree of complement fixation was usually weak and the test of little or no value as a diagnostic procedure.

Much less work of this kind has been conducted with the sera of cattle. The tuberculin test having proven its reliability and sensitiveness as a practical diagnostic procedure has removed in large part the demand for other diagnostic tests. However, since the results of the tuberculin test may be modified or sup-

[1]From the Research Institute of Cutaneous Medicine of Philadelphia and the Laboratories of the Bureau of Animal Industry of Pennsylvania. Presented at the fifty-ninth annual meeting of the American Veterinary Medical Association, St. Louis, Mo., August 28 to September 1, 1922.

pressed in tuberculosis under certain conditions, if a sensitive and specific complement fixation test could be developed it would prove of value as an additional diagnostic procedure for the practical management of a disease of great economic importance.

Furthermore a study of complement fixation in tuberculosis of cattle would appear to be a better means for studying the specificity and sensitiveness of the reaction than is possible in tuberculosis of human beings, in view of the possibilities for checking up the results by tuberculin tests and through necropsy examinations. The present studies were undertaken as part of an extensive series of investigations by one of us (J. A. K.) on the general subject of Complement Fixation In Bacterial Infections as continuing studies of this kind conducted during the past six years on the Standardization of the Wassermann Reaction for syphilis[1]. Our special purpose was to determine the value of the new complement fixation test for syphilis based upon these investigations in the standardization of technic[2], when applied to tuberculosis of cattle, an antigen of tubercle bacilli supplanting of course, the lipoidal extracts employed in the syphilis test.

As previously stated most reported work on the tuberculosis complement fixation test has been conducted with human sera. Studies with cattle sera have been made by Bach[3], Christian and Rosenblatt[4], Porter[5], Wyschelewsky[6], Hammer[7], Bierbaum and Beidel[8] and others. The most recent and valuable contribution has been made by Eichhorn and Blumberg[9] who tested 958 sera with different antigens and concluded that the tuberculosis complement fixation test in cattle was not as reliable as the subcutaneous tuberculin test, is not practical for general diagnostic purposes and at best may be employed as a supplementary test in cases of doubtful or atypical reactions to the subcutaneous or other tuberculin tests.

In our work we had not progressed very far when it became apparent that complement fixation in tuberculosis of the lower

[1]Series of thirty-two papers by Kolmer *et al* published in the Amer. Jour. of Syphilis, beginning 1919, 3, 1.
[2]Kolmer, J. A. Amer. Jour. Syph., 1922, 6, No. 1.
[3]Bach, F. V., Systematische Untersuchungen über die Branchbarkeit der Komplementbindungsmethode für Serumdiagnose der Tuberkulose des Rindes. Inag. Diss., 1909, Leipzig.
[4]Christian, M. and Rosenblatt, S. Münch. Med. Wchn., 1908, 55, 2032.
[5]Porter, A. E., Jour. Hyg., 1911, 5, 105.
[6]Wyschelewsky, S. Ztsch. f. Tuberkuolse, 1912, 19, 209.
[7]Hammer, Deutsch. Tierärztl. Wchn., 1912, 20, 593.
[8]Bierbaum, K. and Berdel, G. Ztsch. f. Immunitatsf., orig. 1914, 21, 249.
[9]Jour. Agricult. Research, 1917, 8, No. 1.

animals offered problems for solution somewhat different from those encountered in human tuberculosis. The most important of these concerned the occurrence of positive reactions with the sera of apparently healthy tuberculin negative cattle showing no lesions of tuberculosis in post mortem examinations. These reactions have proven very disturbing and a study of their nature and mechanism of fundamental importance.

Purposes of Investigation

The purpose of this part of our investigations was to determine the nature and mechanism of these reactions and the results are summarized in this communication.

We have found that these reactions were in part specific and in part non specific, the former being apparently due to the presence of natural complement fixing antibodies removable from sera by absorption with tubercle bacilli, and the latter being greatly influenced by the method employed for the inactivation of serum, the amount of serum used in the tests and to some extent by the kind of primary incubation employed.

Technic

As previously stated the technic employed in all of this work was the new complement fixation test described by one of us (J. A. K.) for syphilis. A complete description of this method is available elsewhere[2] and only the essential principles need be here stated.

(a) An antisheep hemolytic system was employed, the washed corpuscles being used in dose of 0.5 cc of a 2 per cent suspension. The rabbit antisheep hemolysin was titrated each day and employed in the complement and antigen titrations and main tests in dose of two units.

(b) The complement was a mixture of guinea pig sera collected and prepared in a special manner and titrated each day in the presence of the dose of tuberculosis antigen, this being an important principle adopted for a standardized Wassermann reaction. The complement was employed in the antigen titration and main tests in a dose of two units.

Of considerable importance in this connection is the possibility of guinea pig sera containing complement fixing substances for tuberculosis antigen. Some workers believe that it is necessary to test the complement sera for these before the serum may be employed. In a special study of the subject by one of us (J. A. K.) it was found that occasionally the serum of a guinea pig is found to yield slight degrees of complement fixation with some tuberculosis antigens, but by using a mixture of guinea pig sera and titrating the serum in the presence of the antigen, this factor is satisfactorily adjusted.

(c) One kind of antigen was employed throughout being prepared of washed, dried and pulverized bovine tubercle bacilli suspended in water in the proportion of 0.1 gm. in 18 cc followed by boiling with a reflux condenser for one hour and the addition of 2 cc of 10 per cent sodium chloride in water to render isotonic and 0.25 per cent phenol or tricresol.

The antigens were titrated at frequent intervals for anticomplementary activity and employed in the main tests in a dose equivalent to ⅓ or ¼ the anti-complementary unit with varying amounts of serum or the antigen was

[2]Kolmer, J. A. Amer. Jour. Syph., 1922, 6, No. 1.

used in doses of ⅓, ¼, ⅙, ⅛, etc., anti-complimentary units with a constant or fixed dose of serum.

(d) After the primary incubation two units of hemolysin and the corpuscles were added to all tubes and the secondary incubation conducted in a water bath for one hour, the results being read an hour or two later after partial settling of the non hemolyzed cells.

(e) The usual serum, antigen, hemolytic system and corpuscle controls were included in each experiment.

(f) Various methods of heating the sera and conducting the primary incubation were employed, a study of these constituting one of the special objects of this investigation.

PART ONE

THE INFLUENCE OF HEATING CATTLE SERA UPON THE TUBERCULOSIS COMPLEMENT FIXATION TEST

In conducting complement fixation tests it is generally necessary to heat the sera for three main purposes:

(a) To inactivate negative complement;

(b) To destroy native thermolabile antisheep hemolysin, if the latter is present and,

(c) To remove thermolabile anticomplementary substances if these have developed in older sera.

For these purposes sera are generally heated at 55 to 58°C. for thirty minutes. Unfortunately this exposure also destroys a portion of specific complement fixing antibody and for this reason Kolmer adopted a method of heating human sera at 55°C. for 15 minutes as sufficient for the above purposes with a minimum destruction of antibody, inasmuch as experience has shown that it is neither entirely safe nor practical under ordinary routine conditions to use unheated sera.

Animal sera however, behave in a very different manner from human sera when heated at 55°C. While heating for 15 minutes at this temperature has been found eminently satisfactory for human sera it is very unsatisfactory for cattle sera because it greatly increases the percentage of non specific reactions.

This very important influence of heat upon animal sera insofar as complement fixation is concerned, has not attracted the attention it deserves and the majority of investigators have overlooked it entirely. Michaelis[10] was probably first to observe that heated normal rabbit sera may yield positive Wassermann reactions and additional investigations by Schelling and Hoeslin[11] Manwaring[12], Brown and McKenzie[13], Kolmer and Casselman[14] and Kolmer and Trist[15] have amply proven that this occurs, the

[10]Michaelis, D. Berl. kiln. Wchn., 1907, 44, 1103.
[11]Schelling, C. and Hoesslin, Deut. Med. Wchn., 1908, 34, 1422.
[12]Manwaring, W. H. Ztsch. f. Immunitätsf., orig. 1909, 3, 309.
[13]Browning, C. H. and McKenzie, I. Jour. Path. and Bacteriol., 1911, 15, 182.
[14]Kolmer, J. A. and Casselman, A. J., Jour. Med. Research, 1913, 28, 369.
[15]Kolmer, J. A. and Trist, M. E., Jour. Infect. Dis., 1916, 18, 46.

latter investigators showing that normal rabbit serum is even more likely to fix complement in a non specific manner with bacterial antigens than with the lipoidal extracts employed in the Wassermann test. Kolmer and Pearce[16] have also shown that the phenomenon occurs with normal dog sera and one of us (F. B.) has noted the occurrence of these non specific reactions with mule and cattle sera heated at 55°C.

Table 1 gives a summary of the results of our complement fixation tests with the sera of calves, adult cattle, sheep and horses in relation to the influence of heating. The cattle sera were from animals in accredited herds yielding negative tuberculin reactions and clinically free of tuberculosis; the sera from the calves and sheep were from slaughtered animals apparently free of anatomic tubercles and the horse sera were from apparently healthy animals.

TABLE 1.—THE INFLUENCE OF HEATING SERA FROM NON TUBERCULOUS ANIMALS UPON THE RESULTS OF TUBERCULOSIS COMPLEMENT FIXATION REACTIONS.*

Animal Sera	Number Tested	Percentage Positive Reactions		
		Heated at 55°C. 15 min.	Heated at 55°C. 30 min.	Heated at 60°C. 30 min
Adult Cattle.....	58	29%	66%	17%
Calves.....	94	11%	14%	6%
Sheep.....	40	9%	12%	5%
Horses.....	17	53%	Not tested	1—2%

*Primary incubation one hour at 38°C.; antigen employed in dose of ¼ anticomplementary unit. Serum dose 0.1 cc

As shown in this table heating sera at 55°C. for 30 minutes yields the largest number of these reactions. Probably not all of these reactions are non specific; indeed, we shall shortly present evidence indicating that some and particularly those yielding positive reactions when the sera were heated at 60°C. were probably specific and due to tuberculosis amboceptors removable from the sera by absorption with tubercle bacilli.

The results indicate however, that *the temperature employed for the inactivation of sera of clinically non tuberculous animals has a very important influence upon the occurrence of complement fixation reactions; with the sera of cattle, sheep and horses a temperature of at least 60°C. is required for 30 minutes in order to remove or reduce the incidence of non specific reactions, as previously stated the same has been found true of the sera of rabbits, dogs and mules.*

[16]Kolmer, J. A. and Pearce, R. M. Jour. Infect. Dis., 1916, 18, 32.

The nature of the changes occurring in animal sera as a result of heating at 55°C. responsible for these non specific reactions, is not definitely known. Probably it is one of colloidal change. Coccidiosis has been believed by some investigators responsible for the phenomenon in rabbits, but this has been disproven by Kolmer and Trist and others. Kolmer[17] has shown that with rabbit sera both the serum lipoids and proteins are concerned in the process; sera extracted with ether and chloroform were found less fixable and these results have been confirmed by one of us (F. B.) Furthermore the reactions are not due to the summation of the anticomplementary activities of serum and antigen; even perfectly fresh sera free of anticomplementary activity produce these reactions but to a lesser extent than heated sera. The kind of antigen employed is likewise a modifying factor; for example, antigen of B. abortus (Bang) are apparently less apt to yield these reactions than tuberculosis antigens and old antigens of either produce less reactions than fresh antigens.

PART TWO

THE INFLUENCE OF THE METHOD OF PRIMARY INCUBATION UPON THE SPECIFIC AND NON SPECIFIC TUBERCULOSIS COMPLEMENT FIXATION TEST WITH CATTLE SERA

The usual practice in conducting complement fixation tests in veterinary laboratories is to employ a primary period of incubation of antigen, serum and complement of one hour at 37-38°C. in a water bath or thermostat. In the complement fixation test for syphilis the same practice is followed by many serologists but a constantly growing custom is to use a period of 4 to 18 hours at 8-10°C. and Kolmer has adopted for his new complement fixation test, an incubation of 18 hours at 8°C. followed by 10 minutes in a water bath at 38°C., this technic having proven superior to all other methods in an extensive series of experiments.[18].

The temperature and duration of primary incubation influences the results of complement fixation tests in three important particulars:

(a) The degree of complement destruction;

(b) The degree of complement fixed or absorbed by antigen alone and serum alone and

[17]Kolmer, J. A., Jour. Infect. Dis., 1916, 18, 46.
[18]Kolmer, J. A. *et al*, Amer. Jour. Syph., 1920, 4, 675; ibid, 1921, 5, 30; ibid., 1921, 5, 44; ibid., 1921, 5, 63.

(c) The amount of complement fixed or absorbed by mixtures of serum and antigen in the conduct of complement fixation tests.

In a broad and general manner a primary incubation of one hour in a water bath at 38°C. results in slightly greater complement destruction and slightly greater fixation by antigen alone, serum alone and mixtures of these than occurs during one hour in a thermostat. Likewise an incubation of two hours in a water bath results in considerable more complement deterioration and fixation by antigen alone and serum alone than occurs during one hour and slightly more fixation by mixtures of serum and antigen. At 8 to 10°C. for 18 hours there is slightly more complement destruction than occurs during one hour at 38°C. and for this reason the hemolytic system must be adjusted for this kind of primary incubation for satisfactory results, experience having shown that a system yielding good results with warm incubation may be unsatisfactory for the cold method. Furthermore there is considerably more complement fixed or absorbed at 8°C. for 18 hours by antigen alone and serum alone than occurs during one hour at 38°C. For this reason the antigen must be titrated at this temperature because the anticomplementary unit obtained after the cold method of primary incubation is invariably higher than the unit after warm incubation. This greater non specific fixation of complement by antigen and serum alone in the cold method of incubation renders non specific reactions more likely unless accounted for in the adjustment of the hemolytic system, as has been accomplished by Kolmer insofar as tests with human sera are concerned.

In addition however, numerous experiments have shown that a primary incubation of 18 hours at 8°C. also results in a greater degree of specific fixation by mixtures of serum and antigen. This has been found undoubtedly true by Kolmer in tests employing human serum in the Wassermann syphilis tests and likewise in the gonococcus, typhoid and other bacterial complement fixation tests.

In tuberculosis complement fixation tests, however, the evidence is less clear and decisive, and if an incubation of 18 hours at 8°C. is superior, the differences insofar as specific reactions are concerned, are slight.

In these studies three kinds of primary incubation of serum, antigen and complement were employed:

One hour in a water bath at 38°C.

Two hours in a water bath at 38°C.

Eighteen hours in a refrigerator at 8°C.

The results observed in comparative tests are shown in tables 2 and 3.

TABLE 2.—THE INFLUENCE OF TEMPERATURE AND DURATION OF PRIMARY INCUBATION UPON TUBERCULOSIS COMPLEMENT FIXATION TESTS WITH THE SERA OF CLINICALLY NON TUBERCULOUS ANIMALS

Animal Sera	Positive Reactions with Primary Incubation:		
	Water Bath 1 hr. 38°C.	Water Bath 2 hrs. 38°C.	Refrigerator 18 hrs. 8°C.
Adult Cattle.....	17%	31%	32%
Calves*.....	6%	—	6%
Sheep*.....	5%	—	25%
Horses†.....	53%	—	92%

*Sera used in dose of 0.1 cc. with ¼ anticomplementary unit of antigen. Sera heated at 60°C. for ½ hour.

†These sera were heated at 55°C. for 15 min. which largely accounts for the large number of positive reactions.

TABLE 3—THE INFLUENCE OF TEMPERATURE AND DURATION OF PRIMARY INCUBATION UPON COMPLEMENT FIXATION REACTIONS WITH THE SERA OF TUBERCULOUS CATTLE (TUBERCULIN REACTORS OR LESIONS FOUND AT NECROPSY).*

Sera	Positive Reactions with Primary Incubation		
	Water Bath 1 hr. 38°C.	Water Bath 2 hrs. 38°C.	Refrigerator 18 hrs. 8°C.
11	10%	—	20%
35†	75%	86%	94%
23†	14%	—	100%

*All sera used in dose of 0.1 cc. with ¼ anticomplementary unit of antigen. Sera heated at 60°C. for ½ hour.

†Sera heated at 55°C. for 15 minutes (therefore probably includes some non specific reactions).

As shown in table 2 a primary incubation of 2 hours at 38°C. in a water bath greatly increases the percentage of apparent non specific reactions and the refrigerator incubation of 18 hours gives still more of these reactions. Not all of these reactions however, are non specific as will be shown in our second paper.

As shown in table 3 a warm incubation of 38°C. for 2 hours and a cold incubation of 18 hours also increases very materially the percentage of positive reactions observed with the sera of tuberculin reacting cattle and cattle showing the lesions of tuberculosis when examined post mortem. We believe that the cold incubation increases the degree of specific fixation to an extent somewhat greater than it influences non specific fixation, but not nearly so much as it influences the Wassermann reaction with human sera and lipoidal extracts.

As shown in table 3 the influence of the temperature and duration of primary incubation upon non specific complement fixation was shown with the sera of apparently non tuberculous

cattle, calves, sheep and horses; for testing the influence upon reactions with the sera of tuberculous animals only adult cattle were available. We believe that the somewhat greater degree of specific complement fixation at 8°C. for 18 hours offsets the disadvantage of greater non specific fixation providing the tests are conducted with smaller amounts of serum in order to avoid non specific reactions.

The results shown in tables 2 and 3 were tests conducted with 0.1 cc serum. Table 4 shows the influence of using smaller amounts of serum for avoiding non specific reactions with the sera of apparently non tuberculous animals.

TABLE 4—THE INFLUENCE OF AMOUNT OF SERUM EMPLOYED UPON THE PERCENTAGE OF POSITIVE NON SPECIFIC TUBERCULOSIS COMPLEMENT FIXATION TESTS

Sera	Prim. Incub.: 1 hr. 38° C.				Prim. Incub.: 18 hrs. 8° C.			
	0.1 cc	0.05 cc	0.025 cc	0.0125 cc	0.1 cc	0.05 cc	0.025 cc	0.0125 cc
Adult cattle....	17%	3%	0	0	21%	0	0	0
Calves.....	6%	2%	0	0	6%	2%	0	0
Sheep.....	5%	2%	0	0	25%	12%	0	0

As shown in table 4 sera used in dose of 0.025 cc did not yield non specific reactions; this figure agrees very closely with that found by Kolmer for normal rabbit serum when tested with his new complement fixation test.

It is to be remembered in this connection that the complement in these tests was used in dilution of 1:30; with complement 1:10 the tendency for non specific reactions would be less, likewise the sensitiveness of the specific test would be reduced. All figures expressing percentages in this paper are based therefore, upon the particular technic employed and may not (and probably would not) correspond to figures obtained with other methods. But we believe that the following conclusions are generally applicable:

CONCLUSIONS

1. The method of heating (inactivating) sera of the lower animals for complement fixation tests has considerable influence upon the reactions.

2. Heating sera in a water bath at 55°C. for 15 minutes increases the percentage of non specific reactions yielded by the sera of adult cattle, calves, sheep and horses in tuberculosis complement fixation tests.

3. Heating the sera of these animals at 55°C. for 30 minutes increases still more the percentage of non specific tuberculosis complement fixation tests.

4. Heating sera at 60°C. for 30 minutes greatly reduces the percentage of non specific reactions and is the method of choice for preparing the sera of cattle and other of the lower animals for complement fixation tests.

5. Raw or unheated sera are less likely to yield non specific reactions than sera heated at 55°C. but not appreciably less active in this respect than sera heated at 60°C.

6. The temperature and degree of the primary incubation has considerable influence upon the occurrence of non specific and specific tuberculosis complement fixation tests.

7. A primary incubation of 18 hours at 8°C. increases the amount of complement destruction, the amount of complement fixed by antigen alone and serum alone as well as the amount specifically fixed by mixtures of serum and antigen.

8. The method of cold primary incubation of 18 hours at 8°C. is probably preferable to a water bath incubation of one hour at 38°C. but requires the use of smaller amounts of serum for avoiding non specific reactions.

9. With the technic employed in these tests sera used in dose of 0.025 cc do not yield non specific reactions; these amounts may however, yield specific reactions as will be shown in a succeeding report.

II. THE OCCURRENCE OF SPECIFIC TUBERCULOSIS COMPLEMENT FIXING SUBSTANCES IN THE SERA OF TUBERCULIN NEGATIVE CATTLE.

In the tuberculosis complement fixation test with the sera of cattle, the occurrence of positive reactions with the sera of apparently healthy animals yielding negative tuberculin reactions, proves very disturbing and materially reduces the practical diagnostic value of the reaction. Reactions of a similar kind sometimes occur with human sera, that is, when there is no clinical evidence of tuberculosis but in the experience of one of us (J.A.K.) these reactions are much less common than met with among cattle.

Porter[1], Wyschelewsky[2] and others have reported positive reactions with the sera of apparently normal animals; Eichhorn and Blumberg[3] noted their occurrence with 45 or about 14 per

[1]Porter, A. E. The precipitin, complement-binding and antiopsonic tests in tuberculosis and normal cattle. Jour. Hyg., 1911, 5, 105.

[2]Wyschelewsky, S. Beiträge zur Unterscheidung der aktiven und inaktiven Tuberkulose des Rindes mit Hilfe der Komplementbindung, Meiostagmin und opthalmoreaktion. Ztsch. f. Tuberk., 1912, 19, 209.

[3]Eichhorn, A. and Blumberg, A. Diagnosis of Tuberculosis by Complement Fixation, with Special Reference to Bovine Tuberculosis. Jour. Agricult. Research, 1917, 8, No. 1.

cent of a series of 320 sera from animals without lesions and negative to the tuberculin test.

The nature and mechanism of these reactions have not attracted as much attention as their practical and theoretical importance demands. Eichhorn and Blumberg have suggested that the reactions in cattle may be due to the prior injection of tuberculin. They injected two healthy young cattle yielding negative complement fixation reactions, with 2 cc of tuberculin subcutaneously and found that the reactions became positive on the fourth day and strongly positive on the tenth day after injection. This condition persisted for four weeks followed by partial fixation and complete disappearance after six weeks.

In the first part of this paper we have shown that positive reactions with the sera of apparently normal cattle yielding negative tuberculin reactions and showing no lesions of tuberculosis in necropsies, may be due to the commonly employed method of inactivating sera by heating at 55°C.; also that the method of primary incubation employed may favor their occurrence unless smaller amounts of serum are employed in the tests than is commonly practiced. These reactions are apparently non specific and due to some changes in the colloidal reactions of the serum and antigen responsible for the fixation of complement.

But even after these purely non specific factors have been satisfactorily adjusted as they readily may be by technical procedures, a small percentage of sera of adult cattle continue to give positive reactions.

In this connection it is rather significant that the sera of non tuberculous calves almost invariably yield negative reactions. In one series of 60 sera we did not observe a single positive reaction when the sera were heated at 60°C. for 30 minutes and tested with a warm primary incubation; in duplicate tests with these same sera employing cold primary incubation, positive reactions occurred in but three sera, and these were very weakly positive.

This suggests that the reactions with cattle sera are due to acquired tuberculosis complement fixing antibodies either as a result of small latent foci producing insufficient allergic sensitization for yielding tuberculin reactions and escaping detection at necropsy, or as a result of tuberculin injections, as suggested by Eichhorn and Blumberg.

The latter assumption is strongly supported by Eichhorn's and Blumberg's experiment quoted above, although we have found that the sera of rabbits injected with tuberculin subcu-

taneously and intravenously do not show specific complement fixing properties with antigens of tuberculin and tubercle bacilli, until a large number of injections of very large doses over four or more weeks, have been given. Repeated subcutaneous injections of tuberculin in amounts equivalent in body weight to the dose usually given cattle for the tuberculin test always yielded negative results. While these results were observed with rabbits, they do not hoever, necessarily apply to cattle which may react to tuberculin with the production of specific complement fixing antibodies more readily. Indeed, the high percentage of cattle showing these specific reactions in the absence of clinical tuberculosis and the results of Eichhorn's and Blumberg's experiment render this assumption worthy of careful consideration.

All of these reactions in our work occurred with the sera of cattle which had received two or more injections of tuberculin some time prior (4 to 12 months) to the complement fixation tests. Table 5 gives a summary of the results of tests with 162 cattle regarded clinically as non tuberculous and yielding negative tuberculin reactions (subcutaneous injection). As shown in this table, 6 per cent of the sera yielded positive reactions in tests employing 0.05 cc serum and a warm primary incubation; 15 percent reacted positively in tests employing 0.025 cc serum and a cold incubation of 18 hours at 8°C. We believe that the majority of these positive reactions under these circumstances bore some relation to the injections of tuberculin.

As shown in this table the majority of these reactions were weakly positive (+ + or +).

TABLE 5—RESULTS OF TUBERCULOSIS COMPLEMENT FIXATION TESTS WITH THE SERA OF 150 CATTLE CLINICALLY NON TUBERCULOUS AND YIELDING NEGATIVE TUBERCULIN REACTIONS*

Reactions	Water Bath: 1 hr. 38°C.			Refrig. 18 hrs. 8°C.		
	0.05	0.025	0.0125	0.05	0.025	0.0125
+ + + +	0	0	0	6%	1%	0
+ + +	0	0	0	5%	4%	0
+ +	3%	0	0	5%	5%	2%
+	3%	0	0	9%	5%	3%
—	95%	100%	100%	75%	85%	95%
% positive	5%	0	0	25%	15%	5%

*All animals had received two or four injections of tuberculin four months or more before these tests.

Table 6 summarizes the results of additional tests with the sera of 63 cattle, all of which had received two or more injections

of tuberculin, the last from 4 to 12 months prior to the complement fixation tests. The percentage of positive reactions among this group of tuberculin negative cattle is higher than shown in table 1, but this is due to the fact that the tests were conducted with 0.1 cc instead of 0.05 cc serum and for this reason may include some non specific reactions.

TABLE 6—THE RELATION OF INJECTIONS OF TUBERCULIN TO THE OCCURRENCE OF TUBERCULOSI COMPLEMENT FIXATION REACTIONS WITH THE SERA OF TUBERCULIN NEGATIVE CATTLE

Tuberculin Tests*	Months Since Last Test	Total Tested	Method Heating Sera	Positive Fixation Reactions
1st Test 4/1920; 2nd Test 1/1921.....	about 12	18	55°C. 30 min.	27%
1st Test 2/1919; 2nd 8/1919; 3rd 8/1920; 4th 8/1921.....	about 6	18	60°C. 30 min.	6%
1st Test 11/1919; 2nd 11/1920; 3rd 11/1921....	about 4	27	60°C. 30 min.	22%

*All tests conducted with 0.1 cc. serum and primary incubation of one hour at 38°C.

That these positive reactions are caused by the presence of specific antibodies, when precautions are taken against the occurrence of non specific reactions, and may bear a relation to the injection of tuberculin is indicated by the results of our absorption tests. Sera yielding these reactions were treated with a sufficient number of washed dead tubercle bacilli to render the serum distinctly cloudy. These mixtures were then placed in a refrigerator at 8°C. over night followed by two hours in an incubator at 38°C. and very thorough centrifuging. The super-

TABLE 7—THE INFLUENCE OF ABSORBING CATTLE SERA WITH TUBERCLE BACILLI UPON TUBERCULOUS COMPLEMENT FIXATION TESTS*

Plain Sera						Absorbed Sera					
0.1	0.05	0.025	0.0125	0.006	Control	0.1	0.05	0.025	0.0125	0.006	Control
4†	3	2	—	—	—	2	—	—	—	—	—
1	—	—	—	—	—	—	—	—	—	—	—
4	4	3	—	—	—	—	—	—	—	—	—
2	1	—	—	—	—	—	—	—	—	—	—
4	3	2	—	—	—	—	—	—	—	—	—
3	2	—	—	—	—	—	—	—	—	—	—
2	1	—	—	—	—	1	—	—	—	—	—
4	4	3	—	—	—	2	—	—	—	—	—
4	4	2	—	—	—	—	—	—	—	—	—
2	2	1	—	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	—	—	—	—
1	—	—	—	—	—	—	—	—	—	—	—

*Primary incubation 18 hours at 8°C.
†4 = + + + +; 3 = + + +; 2 = + +; etc.

natant and clear sera were then heated at 60°C. for 30 minutes and retested. Table 7 gives a summary of the results observed with 12 positively reacting sera, as examples of a large series. All of these tests were conducted with a primary incubation of 18 hours at 8°C. in order to accentuate the results.

As shown in table 7, treatment of these sera with tubercle bacilli resulted in the complete or nearly complete removal of the substance responsible for the positive reactions. Under those circumstances it is reasonable to assume that these substances were specific tuberculosis amboceptors. Treatment of sera with tubercle bacilli does not remove the non specific substances responsible for positive reactions as a result of heating at 55°C. in other words, absorption with tubercle bacilli does not remove the non specific substances.

Conclusions

1. The sera of 6 to 15 per cent of tuberculin negative cattle may show weakly positive but specific tuberculosis complement fixation tests.

2. These reactions are not caused primarily by non specific factors as result from heating sera at 55°C., temperature and duration of primary incubation, etc.

3. The substance in cattle sera responsible for these reactions is usually removable in whole or part by prolonged absorption of the sera with washed tubercle bacilli. This indicates their specific amboceptor nature.

4. These amboceptors are not usually present in the sera of calves.

5. It is possible that these tuberculosis amboceptors are present in the sera of cattle as natural amboceptors; or they are produced as the result of injections of tuberculin; or possibly but not probably, they are produced by small, undetectable foci of latent tuberculosis.

6. The occurrence of these "normal" but specific reactions very much reduces the practical application of the complement fixation test in the diagnosis of tuberculosis in cattle.

III. THE DIAGNOSTIC VALUE OF THE COMPLEMENT FIXATION TEST IN BOVINE TUBERCULOSIS.

Having shown in the first part of this paper that purely non-specific reactions occurring in tuberculosis complement fixation tests with the sera of cattle may be avoided by careful attention to technical details, of which the proper adjustment of the

hemolytic system, the titration and dose of antigen, and inactivation of serum by heating at 60°C. instead of 55°C. for thirty minutes are important, it remains to determine the occurrence and diagnostic value of the specific reaction. The temperature and duration of primary incubation are also important in relation to non specific reactions and with the method employed in these studies, it was found advisable to use cattle sera in dose of 0.05 cc or less for diagnostic reactions when a primary incubation of 1 hour in a water bath was employed, and not more than 0.025 cc or less when an incubation of 18 hours at 8°C. was employed.

However, as shown in the second part of this paper, even these amounts of serum tested under these conditions will still yield from 6 to 15 per cent positive reactions; these reactions were only weakly positive, but apparently specific, and appeared to bear some relation to the subcutaneous injection of tuberculin, or possibly to the presence of small and latent foci of tuberculosis.

Purpose of Investigation

In this part of our investigation we have examined the sera of tuberculin reactors and of cattle showing lesions of tuberculosis when examined at necropsies. We have aimed to avoid the non-specific reactions, and have sought to determine if by serum dilutions it was possible to differentiate between cattle frankly tuberculous and those clinically free of tuberculosis and yielding negative tuberculin reactions, but which may yield the "normal" or "tuberculin" specific complement fixation reaction.

Review of Literature

Porter[1] found that complement fixation reactions were stronger with the sera of cattle in the advanced stages of tuberculosis than with the sera of normal cattle and animals in the early stages of the disease. Wyschelewsky[2] was not able to differentiate the latent from the more progressive cases. Hammer[3] observed 50 positive and 46 negative reactions in a series of 96 cases, of which 48 were found to show tuberculous lesions on necropsy examination. Bierbaum and Berdel[4], however, were unable to confirm these results. Eichhorn and Blumberg[5] employing

[1]Porter, A. E. The precipitin, complement binding, and antiopsonic tests in tuberculosis and normal cattle. Jour. Hyg., 1911, 5, 105.

[2]Wyschelewsky, S. Beitrag zur Unterscheidung der aktiven und inaktiven Tuberkulose des Rindes mit Hilfe Komplementbindung, Meiostagmin, und Opthalmoreaktion. Ztsch. Tuberkulose, 1912, 19, 203.

[3]Hammer. Die Serodiagnose der Rindertuberkulose. Deut. Tierärtsl. Wchn,..1 912, 20, 539

[4]Bierbaum, K. and Berdel, G. Die Diagnose der Rindertuberkulose mittels der Komplementbindungsreaktion nach der Methose von Hammer. Zts.h. f. Immunitätsf., orig., 1914, 21, 249.

[5]Eichhorn, A. and Blumberg, A. Diagnosis of tuberculosis by complement fixation, with special reference to bovine tuberculosis. Jour. Agricult. Research, 1917, 8, No. 1.

antigens of tuberculin, emulsion of tubercle bacilli, and extracts of tuberculous tissues obtained 81.6 per cent accurate reactions, which they regard as insufficient for rendering the complement fixation test a practical means for the diagnosis and control of the disease.

Antigen and Technic Employed

The kind of antigen employed in tuberculosis complement fixation tests is known to exert a very important influence upon the results. After extensive comparative tests of a large number of antigens prepared by different methods (Besredka's, Miller's, Wilson's, Petroff's, Fleischer's, etc.) Kolmer found that the best method was a slight modification of one of Petroff's antigens, which was described in the first paper of this series, and consists essentially of a suspension of thoroughly pulverized bacilli.

It did not appear to matter whether the antigen was prepared of human or bovine bacilli, although all of the work reported upon in this communication was conducted with antigens of bovine bacilli.

The technic of the complement fixation tests was that of Kolmer's new complement fixation test for syphilis previously outlined. When a water bath primary incubation was employed, the antigen was titrated by the same and employed in a fraction of the anti-complementary unit (usually ⅓ or ¼). When a cold primary incubation was employed, the antigen was titrated by the same method, which is a matter of considerable technical importance.

Results

The results of complement fixation tests with the sera of 220 cattle are summarized in tables 1, 2, and 3. These tables show the percentage of + + + +, + + +, + +, +, and negative reactions observed with 0.1, 0.05 and 0.025 cc of sera in tests conducted with a water bath incubation of one hour and duplicate tests with a primary incubation of 18 hours at 8° C.

Table 8 summarizes the results observed with the sera of 162 clinically non-tuberculous and tuberculin negative cattle; some of the positive reactions were probably due to the presence of natural amboceptors, to the tuberculin injections or possibly, small undiscovered and latent foci. This is particularly true of the 6 per cent positive reactions observed with 0.05 cc amounts

Table 8—Results of Tuberculosis Complement Fixation Tests with 162 Sera of Clinically Non-Tuberculous and Tuberculin Negative Cattle

Reactions	Water Bath: 1 hr. 38°C.			Refrig. 18 hrs. 8°C.		
	0.1	0.05	0.025	0.1	0.05	0.025
+ + + +	2%	0	0	12%	7%	3%
+ + +	4%	0	0	5%	4%	4%
+ +	2%	3%	0	8%	6%	3%
+	7%	3%	0	10%	8%	5%
—	85%	94%	100%	65%	75%	85%
% positive	15%	6%	0	35%	25%	15%

of serum with warm incubation and the 15 per cent positive reactions with 0.025 cc serum and cold incubation. With the larger amounts of serum in both methods, it is highly probable that some of the positive reactions may have been non-specific, as some of the sera had been heated at 55° C. instead of 60° C.

Table 9 summarizes the results observed with the sera of 29 cattle yielding positive tuberculin reactions and regarded clinically as tuberculous, although necropsies were not conducted on this group. The positive reactions were probably due primarily to the existence of active lesions, and secondarily to tuberculin injections or natural amboceptors.

TABLE 9—RESULTS OF TUBERCULOSIS COMPLEMENT FIXATION TESTS WITH 29 SERA OF TUBERCULIN POSITIVE CATTLE (NO NECROPSIES)

Reactions	Water Bath: 1 hr. 38°C.			Refrig. 18 hrs. 8°C.		
	0.1	0.05	0.025	0.1	0.05	0.025
+ + + +	8%	0	0	12%	10%	0
+ + +	2%	3%	0	10%	4%	7%
+ +	10%	7%	0	13%	10%	4%
+	5%	5%	5%	40%	26%	14%
—	75%	85%	95%	25%	50%	75%
% positive	25%	15%	5%	75%	50%	25%

Table 10 summarizes the results observed with the sera of 39 cattle regarded clinically as tuberculous, yielding positive tuberculin reactions and showing tuberculous lesions at necropsies.

TABLE 10–RESULTS OF TUBERCULOSIS COMPLEMENT FIXATION TESTS WITH 39 SERA OF TUBERCULOUS CATTLE (NECROPSIES).

Reactions	Water Bath: 1 hr. 38°C.			Refrig. 18 hrs. 8°C.		
	0.1	0.05	0.025	0.1	0.05	0.025
+ + + +	31%	10%	0	66%	56%	36%
+ + +	5%	15%	3%	5%	10%	15%
+ +	10%	8%	8%	1%	3%	12%
+	14%	17%	14%	3%	3%	9%
—	40%	50%	75%	25%	28%	28%
% positive	60%	50%	25%	75%	72%	72%

As previously stated, we believe that *with the technic employed in this study, the results of specific positive complement fixation reactions due to foci of tuberculosis should be based upon tests conducted with not more than 0.05 cc of serum heated at 60°C. for 30 minutes when a water bath incubation of 1 hour is employed, and*

with not more than 0.025 cc of serum heated at 60°C. for 30 minutes when a refrigerator incubation of 18 hours at 8°C. is employed. Under these conditions purely non specific reactions are avoidable with our technic and the specific reactions due to natural tuberculosis amboceptors, to tuberculin injections or possibly, to very small and latent foci of tuberculosis are reduced to 6 to 15 per cent.

Among cattle yielding positive tuberculin reactions as met with in herds of dairy cows, positive reactions occurred under these conditions in:

(a) 15 per cent by water bath incubation and,
(b) 50 per cent by refrigerator incubation.

Among cattle frankly tuberculous yielding positive tuberculin reactions and showing tuberculous lesions when examined post mortem, positive reactions occurred under these conditions in:

(a) 50 per cent by water bath in incubation and,
(b) 72 per cent by refrigeration incubation.

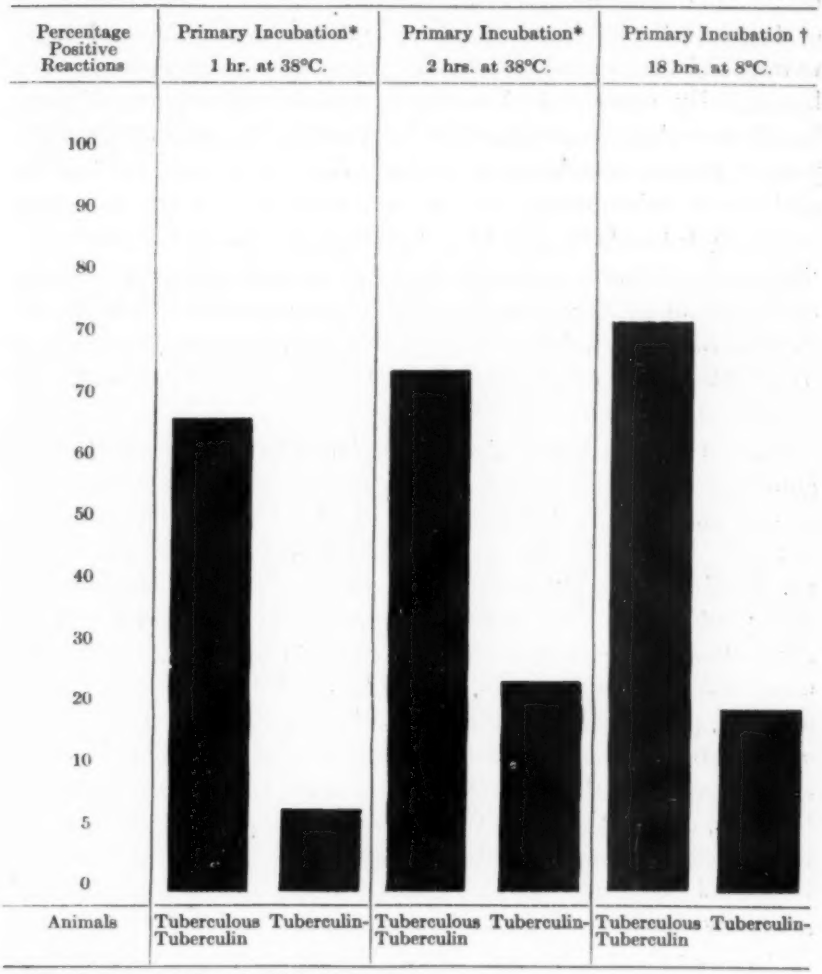
These results are shown graphically in chart 1.

Our percentage of positive reactions with the sera of tuberculous cattle (50 per cent) was, therefore, considerably less than that reported by Eichhorn and Blumberg (81.6 per cent); but their tests were conducted with 0.2 cc of serum heated at 58°C. for thirty minutes and very probably included some non-specific reactions. The slight superiority ofprolonged refrigerator incubation is shown by the higher percentage of positive reactions (72 per cent) in our series, even though it was necessary to use not more than 0.025 cc of serum in order to remove or reduce the chances of securing non-specific reactions.

Under these cond tions, however, a certain number of reactions are lost; that is, positive specific reactions which would otherwise occur if the sera were employed in the larger amounts. The purely non-specific, tuberculin specific, and tuberculosis specific reactions grade from one to the other so gradually that when sera are heated at 60°C. for thirty minutes and used in amounts of 0.05 cc or less for the purpose of preventing positive reactions due to non-specific factors and tuberculin, it leaves only 50 to 72 per cent reactions in tuberculosis, and these percentages are too small for rendering the complement fixation test of practical value. For these reasons the complement fixation reaction is very much less valuable than the tuberculin reaction, and probably cannot be placed on a practical diagnostic basis.

The chief reason for this is that the tubercle bacillus does not

CHART I.



*Based on tests conducted with 0.05 cc. serum.
†Based on tests conducted with 0.025 cc. serum.

engender the production of large amounts of complement fixing antibodies, although foci of living tubercle bacilli produce an exquisite degree of allergic sensitization. It is a common experience that the immunization of the lower animals with the tuberculins or suspensions of dead and even of living bacilli is followed by very tardy antibody production; and even under the best of conditions, the amounts of various antibodies produced, including those responsible for complement fixation, are never very large—seldom as much, for example, as occurs in glanders of horses and syphilis of human beings. For this reason all attempts

toward developing a system of prophylactic immunization of cattle and human beings by injections of tuberculins and vaccines of tubercle bacilli have failed, except for the slight and temporary resistance produced by the intravenous injection of living bacilli. By reason of this poor antigenic quality of tubercle bacilli and their products, it is not possible to prepare immune sera of proven prophylactic and curative properties for human and bovine tuberculosis.

Living tubercle bacilli in actual foci of disease confer some degree of resistance to re-infection due almost entirely to allergic sensitization of the tissues, the allergic reaction following the re-introduction of tubercle bacilli being the protective mechanism. Very little of this resistance can be ascribed to the presence of specific antibodies.

Failure of the tuberculosis complement fixation reaction is generally ascribed to a lack of antigenic sensitiveness of the antigen or an insufficiently sensitive hemolytic system and general technic. Rather it is due in large part to the failure of the tubercle bacillus to produce sufficient amounts of the complement fixing antibodies. Unpublished experiments by Kolmer and his associates have shown that when rabbits are immunized with equal numbers of glanders, typhoid, and tubercle bacilli, pneumococci, gonococci, streptococci, and other organisms, there is a very marked difference in the production of complement fixing antibodies ascribable entirely to immunological differences in the bacteria, and of these the tubercle bacilli were found among the poorest stimulators of antibody production. These fundamental biological facts are the real basis for the low percentage and generally weak specific complement fixation reactions in tuberculosis. The same applies in equal degree to human tuberculosis, although with human sera the difficulties are less, because non-specific reactions do not occur as a result of heating the sera at 55°C. and tuberculin is not frequently administered.

Conclusions

1. In the tuberculosis complement fixation test employed in these studies, cattle sera were heated at 60°C. for thirty minutes and employed in dose of 0.05 cc or less to avoid non-specific reactions with a primary incubation of one hour at 38°C., and in dose of 0.025 cc or less, in a primary incubation of 18 hours at 8°C.

2. Under these conditions, specific reactions due to natural

amboceptors, to tuberculin injections or, possibly, to clinically non-detectable lesions of tuberculosis were reduced to 6 to 15 per cent.

3. Among dairy cows yielding positive tuberculin reactions, positive complement fixation reactions occurred with 15 per cent of sera tests conducted with 0.05 cc serum and warm incubation; with 0.025 cc serum and refrigerator incubation, positive reactions occurred with 50 per cent of sera.

4. Among tuberculous cattle yielding positive tuberculin reactions and showing lesions of tuberculosis, positive reactions occurred with 50 per cent of sera in tests employing 0.05 cc serum and a warm incubation; with 0.025 cc of serum and refrigerator incubation, positive reactions occurred with 72 per cent of sera.

5. The sensitiveness of the tuberculosis complement fixation test is highest with freshly prepared antigens; little or no difference was noted with antigens of human and bovine bacilli.

6. The complement fixation reaction is not a practical diagnostic test for tuberculosis of cattle. The chances for error are too great, and the percentage of true specific reactions too small.

7. The fundamental reason for failure of complement fixation in tuberculosis is lack of production of complement fixing antibodies. Living tubercle bacilli engender a very high degree of allergic sensitization, but relatively small amounts of complement fixing and other serum antibodies.

Discussion

Chairman Pickens: We are now ready for the discussion on Dr. Boerner's paper.

Dr. Eichhorn: Mr. Chairman, I think this is of considerable importance, and I am very pleased with the results we have obtained in the experiments conducted five or six years ago. The problem of diagnosing tuberculosis by biological tests is a difficult one, but, nevertheless, I do not think it should discourage those working along this line from continuing their work, inasmuch as there might be a test, perhaps some complement fixation test, not necessarily this one, but it might be another kind of biological test, that could be utilized for diagnosis and would be of considerable importance in the control of this infection of cattle and animals. The difficult thing which confronts us in obtaining results by the complement fixation test in this disease, I think, is due to two factors, one being the complex condition of the tubercle bacillus. As all investigations have proven, we have to deal with an organism much more complicated than the organisms we have in other diseases in animals or human beings. The second thing is the nature of the disease, which we know may exist in the animal, and in the course of time become, by a little change, either arrested or practically disappeared, as far as it was actually concerned.

Dr. Watson: That paper contained a lot of valuable data and interested me greatly, because we are working on somewhat similar lines in testing out the adaptability and value of complement fixation methods in testing tuberculosis. There is just one point which I would like to give my opinion on, and that is the tendency of these failures, if we may call them such, to arise when using a really satisfactory method of complement fixation test, and that

leads us to suppose that the complement fixation test is not applicable. We are apt to make a mistake there in saying the complement fixation test is not practicable, because we don't know enough about the complement fixation test. I believe myself that the complement fixation test will be found applicable, and that the trouble at the present moment is because we haven't got the right way of applying it or we don't know enough about the biological character of tubercle bacilli.

Dr. Boerner spoke of the properties of tubercle bacilli producing antibodies; that, of course, has been noted, generally speaking, but we have found already that a great deal depends upon the way the bacillus has been grown and prepared. We are to some extent successful in sensitizing or immunizing animals to tubercle antigens. The results vary very much; that is, all the way from negative antibody content in certain tuberculin injections up to a fairly strong antibody content. We have experimented with the tuberculin filtrate, with the unheated boullion filtrate, and they say we have a fair antibody serum; with the unheated boullion filtrate we have used antigens, tubercle bacilli sensitized with different serums, serums of reactors, serums of animals previously sensitized, increasing the doses, etc. I merely mention these to show that we are hardly justified in saying that the tubercle bacillus is a poor antigen in this thing. It depends on how you employ it.There is an enormous void of knowledge on that point, which we have got to work through before we can say the complement fixation test is not applicable. I myself am much encouraged by the results that are being obtained.

I notice in this paper that but one antigen has been used in this test. There is a possibility, by combining antigens, that there may be one antigen that will pick out tuberculosis in a certain form, and another tubercle antigen might be prepared that will pick out another stage of the disease, etc. There is an indication that possibly by using four or five or even more antigens, we will get a very much higher percent of positive reactors, equal or even superior to the tuberculin test. I am a little bit in favor of the complement fixation method because I don't want to see the work stop, the work of trying to evolve a satisfactory method of testing, which will be the greatest value. If we can get a test by which we can take something out of the animal and not be continually putting something in, we will make a big stride in diagnosing tuberculosis. I hope the work will go on until we have arrived at a satisfactory method for making a complement fixation test.

Plan To Go To Montreal, August 27-31.

SOME FINE NEWSPAPER PUBLICITY

The School of Veterinary Medicine of the University of Pennsylvania recently received some very nice publicity in two Philadelphia newspapers. *The Evening Bulletin*, under date of April 14, carried a half-column write-up and two photographs illustrating the article, on the picture page. These showed views in the equine operating room, with a horse about to be placed on the table, and the other with horse ready to be operated upon by Dr. John W. Adams. *The North American*, under date of May 20, ran an article a full column in length, accompanied by a very fine photograph, taken in the Small Animal Clinic, showing several canine patients having broken legs placed in splints.

EVERSION OF THE UTERUS IN THE COW[1]

By J. J. KLINE, *Danville, Pa.*

The uterus, or womb, is a musculo-membranous sac situated in the sublumbar region and pelvic cavity; it consists of a body and two cornua. The body is cylindrical and somewhat flattened; the anterior extremity, or fundus, is continuous with the cornua; the posterior is continuous with the vagina, constituting the cervix, or neck. In the centre is a transverse aperture or fissure opening into the vagina, called the os uteri.

The cylindrical cornua, which are slightly "twisted" in the cow, spring from the anterior extremity of the body, diverge upwards and forwards, together presenting an inferior free convex curvature and a superior concave one, to which are attached the suspensory ligaments. Their posterior extremity is continuous with the body; while the anterior or summit, forms a cavity turned upwards, into which the fallopian tube enters.

The uterus consists of three coats; serous, muscular, and mucous. The serous covers the body and horns, forms the broad, or suspensory ligaments, which pass from either side of the uterus to the pelvic walls, forming a septum across, dividing the pelvis into the inferior and superior portions. The round ligaments arise from the upper angle of the uterus, proceed to the internal abdominal rings through the inguinal canals, and are lost in front of the symphysis pubis.

The muscular coat consists of two layers, the longitudinal and transverse. The mucous coat is of a pale reddish color, closely adherent to the muscular coat and in the cow presents a number of rounded, vascular processes, which exhibit eminences and depressions; these are termed the maternal cotyledons.

Eversion of the uterus signifies a form of hernia of the organ, consisting in its partial or complete turning inside out; the everted fundus escaping through the os uteri (partial eversion), vagina, and vulva, and perhaps descending as low as the hocks (complete eversion), where it forms a more or less voluminous tumor.

When the eversion is very partial, nothing is seen externally, and an exploration alone reveals the existence of the accident; if more developed, the uterus appears as a round tumor between

[1]Presented at the annual meeting of the Pennsylvania State Veterinary Medical Association, Harrisburg, Pa., January 23 and 24, 1923.

the labia of the vulva when the animal is lying, and especially if the floor is sloping backwards, which causes the gastro-intestinal mass to press upon the organ. Sometimes the prolapse is so very slight that there is merely a bulging inward of the fundus, or one of the cornua.

In complete eversion, we frequently have prolapse of a portion of the vagina; and it is recognized as appearing in two forms or degrees, according as there is eversion of the body of the uterus, or eversion of the cornua, which is then deviated to the right or left of the vertical direction of the body of the organ, according as it is one or other of these parts. If both cornua are completely everted, they terminate inferiorly in the form of a cone; but if they are only incompletely so, then they remain cylindrical at their lower end, and at the centre of the cylinder is a depression or cecal cavity.

Eversion of the uterus is possible only when the os uteri is dilated; consequently, it occurs either immediately or soon after calving. It is simple or complicated. It is simple when the viscus is intact, uninjured, and not accompanied by the extrusion or displacement of any other organ. When it is wounded or torn, or when there is accompanying hernia or protrusion of other viscera, then it is complicated.

The symptoms of uterine eversion vary with its extent. Eversion always commences at the fundus of the organ, most frequently towards the largest cornua, where the greater part of the foetus was lodged. Under the influence of an irregular, and kind of spasmodic contraction, this part is drawn, or pushed, inwards; and this action continuing, the fundus or cornua is more or less rapidly carried toward the os, through which it passes into the vagina, dragging after it the body of the organ, which also becomes everted as it proceeds.

The considerable alteration in position and relations which has already taken place, gives rise to sensations of discomfort and pain, and these react on the nervous system, and induce contraction of the uterine and abdominal muscles. Powerful and hurried expulsive efforts ensue, and soon the organ is pushed beyond the vulva, and renders the prolapsus complete, the lining of mucous membrane having become external.

Sometimes we notice portions of chorion still attached to the placental surface of the uterus; and nearly always are seen excoriations, more or less extensive; indications of the injury the organ has sustained, either after or during parturition.

The longer the period which has elapsed since eversion occurred, so the longer is the tumor. This increase is due to the violent expulsive efforts of the animal, as well as to the increase in weight of the organ in consequence of the congestion and infiltration which has taken place in its tissues; constricted—even strangulated—at its upper part, the circulation is maintained with great difficulty, and the capillaries become engorged with blood. The walls of the organ lose their elasticity, become thickened and dense; from its increased volume and position, its reposition is rendered extremely difficult, if not impossible.

At first, there is no perceptible fever, and the animal, in the intervals of straining, attentive to what is going on around it, is solicitous about its progeny, and may even eat. This state is not of long duration, however, for soon after eversion is complete, indications of fever manifest themselves; quickened pulse and respirations, elevated temperature and an expression of anxiety and pain. The straining is more frequent and energetic, and soon exhausts the animal; and the prostration, together with the great weight of the pendent uterus, compels it to assume and maintain the recumbent posture, in spite of attempts to make it get up.

One of the ordinary complications of this accident is the adherence of the foetal placenta to the cotyledons. The complete eversion of the uterus also brings about displacement of the vagina; the deeper portion of this part is found folded on the neighboring surface of the cervix; the bladder and inferior wall of the rectum are drawn into the middle of the pelvic canal, and occupy the place the uterus has quitted; the meatus urinarius is doubled on itself, and so compressed that no urine can flow through it; while the ureters continuing to carry that fluid to the bladder, this reservoir soon becomes filled and greatly distended, without relief being possible. Hence results another source of suffering, and another cause of exhausting efforts which are added to those occasioned by the prolapsed uterus. In certain cases there may also exist prolapsus of the rectum, and displacement, or even eversion, of the bladder.

The uterus may also be wounded or torn, either from bad management during parturition, or from injudicious attempts at reposition; or the injury may be due to rats, cats, dogs, or hogs gnawing at the bleeding mass; or a neighboring animal which inflicts the damage, by stepping on it. After reduction has been effected, metritis and metroperitonitis may appear; this may be

a consequence of gangrene and septic infection.

Prognosis

There can scarcely be any doubt that, if no assistance is rendered to an animal suffering from prolapsus uteri, death must ensue, and more or less speedily; as gangrene is inevitable, while spontaneous reduction is impossible. In some instances death occurs in less than twenty-four hours, while others may live from three to five days, very rarely longer.

Eversion of the uterus is generally fatal when owners of animals have neglected to procure assistance until too late, or who employ ignorant people to attempt reduction. If attended to sufficiently early by those who are competent, the number of recoveries is considerable, and perhaps in no other pathological condition is the utility and power of art, when invoked at the proper time, better demonstrated.

Causes

Eversion of the uterus is generally consecutive to parturition, and is most frequent in the cow, whose uterine ligaments are so extensive and extensible. It usually occurs within a day or two after parturition, before the os uteri is closed.

In order that it can occur, a certain degree of relaxation of the sub-lumbar uterine ligaments must be present; there must also be some cause of irritation in operation, after the expulsion of the foetus, sufficient to excite the contraction of the muscles of the uterus and lead to eversion, though it is often difficult to ascertain what this cause may be.

In very many instances gestation has gone on to its full term, the animal is strong and healthy, birth natural and easy, and there is nothing to indicate the advent of such an accident—when, suddenly, after a few expulsive efforts, the uterus is ejected in an everted state.

It has been attempted to explain the occurrence of the accident, by alluding to the lymphatic temperament of the animals, and their consequent laxity of tissues; and it is often the case that cows which are "soft," and kept on food that is better suited for the production of milk than flesh, are the most frequent subjects of eversion.

Difficult and laborious parturition, when much manipulation and energetic traction on the foetus have been employed, has likewise been acknowledged as a cause; and it is certain that the efforts to remove a foetus which—whether from malposition,

deviation of parts, excess of volume, etc.—cannot be expelled in a natural manner, are frequently followed by this accident. But on the other hand, we often find that the most vigorous—even painful and violent traction, and long and complicated manoeuvres—are not succeeded by eversion; while, on the contrary, the easiest and most rapid birth sometimes is.

The retention of the placenta, beyond the ordinary period, must also be taken into account as one of the exciting causes; as it then acts as a foreign body, irritates the interior of the uterus, and so by a reflex action induces contraction of its muscular layer—thus giving rise to invagination of the extremity of one of the cornua, which is supposed to be the commencement of eversion.

It is also probable that injudicious traction on the foetal membranes may bring about this result in a flaccid and dilated uterus, when the cervix is also relaxed. More especially is this likely to happen if the placenta is adherent towards the fundus of the organ, or in one cornua.

Some mystery appears to have attached to this eversion of the uterus, and though various causes have been assigned as operating in its production, yet as these were not present in every case, it has been admitted that a peculiar predisposition must have existed.

Several causes may be invoked to account for the accident. A flaccid, non-contracted uterus after birth, with a weak cervix and dilated os, and relaxed broad ligaments, point to a predisposing condition; and this is most likely to be present in lymphatic animals, or those suffering from atony, brought about by debility through disease, or bad or insufficient food, exposure to weather, etc. Any trifling irritation may lead to a wrong movement of the fundus or one of the cornua, and once commenced it is far more likely to continue than to cease.

Treatment

Whatever may be the cause of eversion of the uterus, the obstetrician must lose no time in remedying the accident; as when interference is not prompt, a fatal termination, or at the very least, most serious consequences rapidly ensue.

The preliminary measures consist in combating the local and general symptoms. If the animal is lying down, it must be got up by some means or other, as the standing attitude is by far the best for reducing the eversion, there being more space in the

abdomen when its walls are not compressed by the floor, and the obstetrician can operate more easily and quickly, while the downward inclination of the lower surface of the pelvis and abdomen is favorable for reduction.

If it cannot be made to get up, or is unable to stand when raised, then reposition must be effected while it is lying, by raising the hind quarters of the animal as much as possible, by means of bundles of straw placed under them. Difficulty in reduction may be somewhat diminished, if all the litter be removed from beneath the abdomen, so as to relieve the viscera it contains from pressure as much as possible.

If the accident is recent, an hour or two, or a little longer, the uterus may be returned at once; but should a longer interval have elapsed, it is well to ascertain the condition of the rectum and bladder, and to empty them if necessary.

Should the foetal membranes still be adherent—wholly or partially—then they must be carefully removed without injuring the cotyledons; and if any pulpy gangrenous cotyledons are found, it is better to remove them at once then leave them to be eliminated in the ordinary way; though if they show any vitality at all they need not be interfered with. Torn or gangrenous portions of mucous membrane are also to be excised.

The uterus should be cleansed from matters adhering to its surface, such as litter, mud, dirt, filth or blood; by means of a fine sponge or soft cloth and water. Milk and water makes a desirable wash. Astringent or soothing lotions are recommended, if there is much tumefaction or irritation present. Some practitioners immerse the entire uterus in cold water, allowing it to remain in it for as long as five or ten minutes. By this means it is freed from extraneous matter and cleansed; while the congestion is allayed and the mass considerably reduced in size.

If from long eversion and consequent congestion, infiltration, or inflammation, the volume of the uterus is so increased that it appears impossible to return it, superficial scarifications may be made on its surface; a few of these often lead to a notable decrease in its size, and reduction may then be effected.

If the uterus is torn, it may be necessary to close the wound by the continuous suture. If the wound, however, is not extensive, it need not be closed. There are many cases on record in which wounds of the uterus have not been sutured; the organ having been merely returned to the abdominal cavity, and recovery has taken place. If hernia of the intestines or any other

viscus is present, then, of course, this must be reduced before the uterus.

When eversion of the uterus is incomplete, and the organ has not passed beyond the vagina, reduction is comparatively easy. It is sufficient to introduce the closed fist into the vagina, and to push the uterus as far into the abdomen as may be deemed necessary, smooth it out by removing all folds and kinks, and let your hand remain in the uterus for a short time, until straining ceases, then place the animal in a narrow stall and elevate the hind quarters.

If the uterine tumor is voluminous, and hangs as a heavy mass, as low as the hocks, the best method is to return, first, the parts of the organ nearest the vulva. In order to accomplish this, two assistants, one on each side of the croup, raise the uterus with a well moistened and clean sheet, so as to bring it near the vulva, and opposite the axis of the pelvis. Then the operator gently presses with open hands on each side on the parts close to the vulvar opening, in order to force them gradually into it. By acting in this way with care and patience, and preventing, as well as he can, the expulsion of these portions he has already reduced, the tumor by degrees becomes diminished, and may be entirely returned. In some instances it will be found that, towards the termination of reduction, the organ itself returns to its normal position.

When the uterus has been returned to the abdominal cavity, the operator has then to ascertain if it is properly disposed. It sometimes happens that the extremity of one or other of the cornua remains incomplete; this will undoubtedly induce renewed straining, and in all probability bring about re-eversion. It is, therefore, essential that the hand of the operator should carefully examine every part of the interior of the uterus and the genital canal, and particularly around the cervix.

When reposition has been finally accomplished, the straining ceases, and the animal soon appears to be quite easy; it is advisable to keep the hand in the uterus for a short time until the latter begins to contract freely; if this is not done, the flaccid organ may again become everted.

Retention

Reduction of the everted uterus having been accomplished, and everything done to remove the slightest traces of invagination, certain precautions must be adopted against a possible

recurrence of the accident. This recurrence is to a certain extent provided for by raising the croup of the animal as high as may be convenient, either by means of litter or boards. But this is not always a preventive, and other means have been devised for retaining the uterus in its place until all risk of another eversion has passed away. These devises consist of pessaries, sutures, and bandages or trusses.

Pessaries are instruments of various forms, which are introduced into the genital organs, and kept there for a certain time, in order to prevent displacement of the uterus after its reduction. Sutures may be of hemp, silk, or metal; and they may be passed directly through the lips of the vulva, or include the skin towards the point of the hip, on each side. The first, the labial suture, the second, the hip stuure. Bandages, or trusses, may be composed of cords, surcingles, leather, canvas, etc., which are so arranged and disposed as to make pressure upon the sides of the vulva, and by keeping it closed, prevent the extrusion of the uterus, without interfering with defecation or micturition.

There are several kinds of trusses in use, and these vary somewhat in their details, though in principle they are the same. The most useful and readily made truss is composed of light rope about the thickness of a man's little finger, or an ordinary rope clothes-line, about thirty feet long, divided in the middle, making two ropes. These two ropes are doubled upon themselves, forming two loops, which by inter-weaving a few times will form a stationary loop in their middle, in such manner that an oval space, sufficient to admit the vulva, and compress it laterally, is formed; the inferior commissure being left free, to allow the escape of urine and uterine discharges, should there be any. The two portions of one of the ropes, passing over the back, are secured around the neck or chest; while those of the other rope pass between the thighs, and are brought up immediately in front of the stifle, up and anterior of the angle of the ilium, and secured to the back rope, from both sides.

Amputation

In certain cases the uterus is so injured, either by the unskillful attempts of ignorant men to return it, or from other causes, that it would be certain death to the animal to replace it in the abdomen. These other causes consist of extensive lacerations and bruises, or when the organ has become softened and gangrenous. Lacerations and ruptures are always more serious in

the lower than the upper wall of the uterus. In such exceptional circumstances complete extirpation of the uterus has been practiced.

Though the operation is apparently a most formidable and painful one, and only to be ventured upon as a last resource, yet, on the whole, it is tolerably successful. Various modes of operating have been practiced and recommended. Chloroform, chloral, or morphia may be administered to the animal about to be operated upon. It is also a good plan to tie the uterus up in a large cloth, so that it may be more easily moved about by the operator or assistants, and render the operation cleaner and less repulsive looking.

Perhaps the most popular method is the ligature in mass. A piece of strong whipcord, well waxed and made into a running loop, is passed over the tumor as near the vulva as possible, but without including the meatus urinarius. When evenly placed around the pedicle, it is then gradually, but firmly, tightened by pulling at each end so as completely to intercept the circulation in the mass. This done, the cord is tied in a knot.

Though this method has been much employed, and with a fair amount of success, yet it has been condemned by some good authorities, on the plea that it is dangerous to tie such a voluminous mass; as all the parts can not be sufficiently and equally compressed to become mortified at the same time. Those parts which have not been firmly bound still retain a certain amount of circulation, become inflamed, and occasion violent pain.

Therefore a double ligature has been recommended. A long sacking needle is armed with a somewhat long double piece of whipcord. This is passed through the middle of the pedicle of the tumor, from below to above; and the needle cut away from the cord. The pedicle is thus perforated by two pieces of cord; one of these is firmly tied round the right half of the pedicle, the other round the left, so as to include the whole in two separate ligatures.

The uterus of the cow has been successfully deprived of its circulation by means of clamps applied close to the vulva. By whatever procedure the pedicle is rigidly compressed, the uterus has afterwards to be excised. When the uterus has been cut away, the portion of vagina or cervix remaining should be returned as far as possible into the genital canal, and if there is any hemorrhage, injections of cold water will probably check it. Cicatrization generally occurs within about fourteen days.

SOME CRITICAL TESTS OF ARECOLINE HYDROBROMIDE AS AN ANTHELMINTIC

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The areca nut used in medicine is derived from the fruit of an East India palm, *Areca catechu*. Areca nut, mixed with the leaves of the betel pepper and with lime, is chewed by natives of parts of the Orient, the mixture being known as betel nut. Betel nut imparts a red color to the saliva and excreta.

Areca nut, powdered, has long been in use in human and veterinary medicine as an anthelmintic, and appears to have been used as a folk remedy for worms in India before obtaining a place in medical practice. According to the Dispensatory, it was reported as a taeniacide in human medicine by Edw. Morris, at least as early as 1862, and as a taeniacide for dogs in veterinary medicine by Hanley (cited by Dun) the same year. In human medicine, the usual dose is 1 to 2 drams (3.9 to 7.7 gm.). In veterinary medicine, the doses given by Winslow are: Horses, 0.5 to 1 ounce (15 to 30 gm.); lambs, 1 dram (4 gm.); dogs, 2 grains for each pound of live weight (2.85 gm. for a 10-kilo dog); fowls, 10 to 40 gr. (0.648 to 2.59 gm.). The nut should be freshly ground for use as an anthelmintic, as it loses its potency with age and ultimately becomes inert or practically inert. In large doses the drug is a cathartic, but in small doses it is astringent. Substantially the same is true of a number of other drugs, and failures to use adequate doses of purgatives in connection with anthelmintics may give rise to bad effects, following a constipation resulting from the use of doses too small to induce purgation.

Areca nut contains arecoline, arecaine, arecaidine, guvacine, red tannic acid, and an oil. The arecoline is undoubtedly anthelmintic and, according to Jahns, the arecaine is also a taeniacide. A very effective combination of male fern and areca nut which has been extensively used with excellent results by Dr. E. T. Davison, of the Bureau of Animal Industry, is used as follows: Fast dog overnight. At 10:00 a. m., for dogs of average size, give 4 10-grain capsules (those holding 10 grains of quinine) filled with oleoresin of male fern, and follow with an ounce of water or milk, preferably milk. Forty-five minutes later, give

4 10-grain capsules full of freshly ground areca nut, and follow this with an ounce of milk or water as above. Worms usually pass in a half-hour to an hour.

The fact that areca nut should be freshly ground for use each time constitutes more or less of an objection to its use and limits its usefulness in some respects. Areca nuts are quite hard and it is something of a task to grind or "cobble" areca nuts by means of machines operated by hand. Furthermore, the fact that the drug loses its potency after grinding makes it somewhat unsuitable for use in preparations to be marketed and perhaps held for considerable periods of time before use.

Recently one of the salts of arecoline, arecoline hydrobromide, has come into rather common use as an anthelmintic in canine practice. This drug has been used for some years in veterinary medicine as a purgative, being given subcutaneously. It is mentioned in this connection by Winslow, in 1908. It seems to have been used as an anthelmintic in human medicine before it was used in veterinary medicine, and the Nineteenth Edition of the Dispensatory, issued about 15 years ago, states: "In human medicine it has been used in the dose of one-fifteenth to one-tenth grain (0.004-0.006 gm.) against the tapeworm and as a myotic." The use of this drug in human medicine evidently received little attention and is little known among medical men. We are informed by Dr. David E. Buckingham that a physician in Washington has used this drug successfully in his practice on at least one occasion.

In veterinary medicine, the use of arecoline hydrobromide as an anthelmintic appears to have been first recommended, so far as we have ascertained, by Lentz, in 1921, in an article published in the University of Pennsylvania Bulletin, Veterinary Extension Quarterly, Number 3, this article being republished in the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION for December, 1921. Lentz makes the following statements in connection with the subject of tapeworm infestation: "Many drugs have been recommended in the treatment of animals infested with these parasites, but none act so quickly and seem to possess such a specific action against them in the dog as arecoline hydrobromide. This drug is given by the mouth in tablet form on an empty stomach. One-fourth of a grain may be given to medium-sized dogs and one-eighth of a grain to the small breeds. It acts on the bowels in from 20 minutes to one-half hour and the parasites are passed with feces. A single treatment

seems to remove all the parasites including the heads. . . . It is of advantage to follow the arecoline treatment, after the worms have been passed, with 10 to 15 drops of camphorated tincture of opium (paregoric) in a dram of essence of pepsin to quiet down the excessive peristaltic action caused by the arecoline."

Since experience shows that the actual efficacy of an anthelmintic can not be determined with any degree of accuracy on clinical findings alone, and since arecoline hydrobromide is being extensively used, we have carried on some critical tests, collecting all worms passed or present post mortem, to obtain some definite information as to the action of this drug, using dogs and chickens infested with tapeworms as test animals. The drug used was analyzed in the Biochemic Division of this bureau and found to be arecoline hydrobromide in the amount stated for the tablets used. The tests on dogs were as follows:

THERAPEUTIC DOSES BY MOUTH

Dog 426; wt. 40 pounds (18 kilos); 1/8 grain in tablet; feces containing 2 complete, live tapeworms in 9 minutes; vomited twice; no other worms passed in 2 days; post mortem, 1 hookworm; 100 per cent effective against tapeworms, 0 per cent against hookworms.

Dog 432; wt. 30 pounds (14 kilos); 1/4 grain in tablet; feces containing 1 complete, live tapeworm in 30 minutes; vomited once; much depressed; 4 ascarids passed the first day; post mortem, 2 days after treatment, 32 whipworms, 1 hookworm; 100 per cent effective against tapeworms and ascarids, 0 per cent against whipworms and hookworms.

Dog 435; wt. 25 pounds (11 kilos); 1/4 grain in tablet; no feces the first hour; no worms passed in 2 days; post mortem, 1 tapeworm, 79 hookworms; 0 per cent effective against tapeworms and hookworms.

Dog 487; wt. 25 pounds (11 kilos); 1/4 grain in tablet; no feces the first hour; no worms passed in 2 days; post mortem, 1 tapeworm, 4 ascarids; 0 per cent effective against tapeworms and ascarids.

Dog 490; wt. 20 pounds (9 kilos); 1/4 grain in tablet; passed formed feces and vomited in 30 minutes; passed soft feces with 1 complete, live tapeworm in 50 minutes; no other worms passed in 2 days; post mortem, 5 hookworms, and 4 whipworms; 100 per cent effective against tapeworms, 0 per cent against

hookworms and whipworms.

Dog 556; wt. 22 pounds (10 kilos); ¼ grain in capsule; passed tapeworm fragments the first day; no worms the next 3 days; post mortem, no worms; 100 per cent effective against tapeworms.

Dog 558; wt. 20 pounds (9 kilos); ¼ grain in tablet; passed tapeworm fragments second day, with no heads; no other worms in 4 days; post mortem, 2 tapeworms, 12 whipworms; 0 per cent effective against tapeworms and whipworms.

In 7 experiments, using therapeutic doses, arecoline hydrobromide removed all the tapeworms in 4 cases and none in 3 cases; all the ascarids in 1 case and none in 1 case; no hookworms in the 4 cases where this worm was present; and no whipworms in the 3 cases where this worm was present. Whenever tapeworms were promptly examined after passage they were found alive; this was true of *Taenia* and of *Dipylidium*.

Dr. Quitman writes us that Frohner injected arecoline hydrobromide into the ligated intestinal loop containing numerous worms, without visible effect on the worms. In our opinion, there is an anthelmintic effect, quite apart from a purgative effect, even though it was not detected in Frohner's experiments.

Reports received in correspondence indicate that arecoline hydrobromide will sometimes fail to remove tapeworms in practice, as well as in critical experiments. One correspondent reports his results as follows:

Dog 1; 50 pounds; ¼ grain; passed several tapeworms, most of them with heads; repeated treatment 10 days later; passed 2 tapeworms, 1 with head, the other uncertain as to this.

Dog 2; 15 pounds; ⅛ grain; passed about 100 small, complete tapeworms; 7 days later gave 0.5 cc oil of chenopodium in a half-ounce of castor oil; dog vomited 3 complete tapeworms; 3 days later gave ⅛ grain arecoline hydrobromide; no tapeworms passed.

Dog 3; 15 pounds; ⅛ grain; no bowel movement in 3 hours; treatment repeated at this interval; treatment repeated for the third time after an interval; small amount of feces, but no worms; 10 days later repeated treatment; no bowel movement in 3 hours; treatment repeated at this interval; dog passed a large number of tapeworms in 40 minutes.

In the above reports, initial treatments failed to get all of the tapeworms in all 3 cases. A second treatment brought away tapeworms in 1 case; a different treatment resulted in tapeworms being vomited in 1 case; a second, third and fourth treatment

removed no tapeworms in the third case, but a fifth treatment removed a large number.

Excessive Doses by Mouth

Dog 565; wt. 22.5 pounds (10 kilos); 1.5 grains in tablet; vomited in 4.5 minutes; passed feces in 27 minutes; passed 15 tapeworms, 1 ascarid and 1 hookworm the first day; no other worms passed in 4 days; post mortem, 2 ascarids, 81 whipworms; 100 per cent effective against tapeworms and hookworms, 33 per cent against ascarids, 0 per cent against whipworms.

Dog 567; wt. 24 pounds (11 kilos); 2 grains in tablet; feces in 7 minutes; vomited within 24 minutes; passed 3 tapeworms the first day; no other worms passed in 4 days; post mortem, 5 tapeworms, 8 hookworms, 64 whipworms; 37.5 per cent effective against tapeworms, 0 per cent against hookworms and whipworms.

In these 2 experiments, using excessive doses (1.5 to 2 grains), arecoline hydrobromide removed all the tapeworms in 1 case and 37.5 per cent in 1 case; all the hookworms (1) in 1 case and none in 1 case; no whipworms in either case.

In the following experiments the dogs did not have tapeworms and were not killed, the test being primarily to determine the tolerance of dogs for excessive doses.

Dog 566; wt. 15 pounds (7 kilos); ½ grain in tablet; vomited and passed feces in 3 minutes; no worms the next 4 days.

Dog 568; wt. 21 pounds (9.5 kilos); 1 grain in tablet; vomited in 6 minutes; passed feces in 8 minutes; dog sick and trembling; passed 1 whipworm the second day and 4 whipworms the fourth day.

Dog 469; wt. 22 pounds (10 kilos); 1.5 grains in tablet; dog lying down, collapsed in 1 minute (this dog was evidently suffering from some condition apart from the effects of the drug and did not behave like a normal dog); vomited in less than 20 minutes and again in 20 minutes; passed 1 whipworm the first day and 1 the second day.

Dog 564; wt. 28.5 pounds (13 kilos); 2 grains in tablet; vomited and passed feces in 4 minutes; lay down in 9 minutes; no worms in 4 days.

In the above experiments a small dog (7 kilos) tolerated ½ grain of arecoline hydrobromide, dogs of average size (9.5 and 10 kilos) tolerated 1 to 1.5 grains, and a dog of slightly more than average size (13 kilos) tolerated 2 grains. The three larger animals showed whipworm eggs on fecal examination and in

these large doses the drug removed some whipworms from 2 dogs, but in the largest dose (2 grains) failed to remove any from a lightly infested dog. The safety may be correlated in part with the occurrence of emesis, tending to cause the automatic rejection of excessive amounts of the drug.

The correspondent previously referred to reports that he has given a pup, 6 weeks old, weighing 5 pounds, a dose of ⅛ grain without bad results.

Excessive Doses Hypodermically

In view of the fact that some persons have suggested to us that arecoline hydrobromide might remove tapeworms purely as a result of its purgative action, the following experiments were carried out, the drug being given hypodermically. According to Lynch, the dose of arecoline hydrobromide, to secure purgation in the dog, is 1/30 to 1/15 grain. The doses we employed were larger.

Dog 549; wt. 13.5 pounds (6 kilos); ⅛ grain in solution; considerable depression 10 minutes after dosing; few terminal segments of tapeworm passed the next 2 days; post mortem, 11 tapeworms (6 *Taenia pisiformis* and 5 *Dipylidium caninum*), 8 hookworms, 11 whipworms. No tapeworms, hookworms or whipworms removed by treatment.

Dog 552; wt. 18.5 pounds (9 kilos); ¼ grain in solution; pronounced weakness and depression 10 minutes after dosing, persisting for about 30 minutes; no worms passed in 2 days; postmortem, 8 tapeworms (*D. caninum*), 2 ascarids, 10 whipworms. No tapeworms, ascarids or whipworms removed by treatment.

Two other dogs, Nos. 546 (10 kilos) and 542 (8.5 kilos), were also given ¼ grain in solution hypodermically, but were not examined postmortem. The drug produced extreme depression, lasting about 30 minutes.

The above results are in accord with what we would expect. It is true that purgatives will occasionally remove some worms, but this is not a dependable anthelmintic action and is apparently due to certain factors, such as old age or disease conditions on the part of the worms removed, which can not be depended on to be present in the majority of cases. Hall and Foster (1918) report that calomel, 4 to 5 grains (erroneously stated as grams), followed by castor oil, removed 1 ascarid from 4 infested dogs, 2 of these dogs showing 8 and 10 ascarids each post mortem, the others not being killed; castor oil administered to 50 dogs removed

27 ascarids out of 351 present, or a little over 7 per cent, removed 1 hookworm out of 1,062, and 2 whipworms out of 464.

Some anthelmintics, as chenopodium, are constipating, while others, as areca nut, are purgative, a fact which is partly responsible for the somewhat academic distinction between vermicides and vermifuges, but if drugs remove worms with any degree of certainty we must assume that they exert some action on the worms, in addition to their purgative action on the intestine where such action is present. This action may or may not be destructive to the worms, it may be depressant or stimulative, and the fact that the worms are alive when passed, especially when passed very soon after the administration of the drug, does not preclude the existence of an adverse action on the worms. We have already referred to Fröhner's experiments in this connection. The production of temporary or permanent incoordination, due to the action of a drug on the nervous or muscular system of the worm and resulting in inability on the part of the worm to maintain its position in the host animal, must be regarded as an anthelmintic action of a definite sort on the part of the drug. Santonin appears to have such an action.

So far as arecoline hydrobromide is concerned, it would be expected that if the drug had an anthelmintic action when administered hypodermically the fact would have been noted in veterinary practice. Our experiments with its hypodermic administration are too few of themselves, especially in view of some failures with the drug when given by mouth, to permit us to draw definite conclusions except in connection with clinical experience, but this clinical experience seems to sustain the idea that the drug is not anthelmintic when given hypodermically.

Experiments with Birds

The drugs commonly used to remove tapeworms from mammals are not very effective as a rule in removing tapeworms from chickens. The following experiments were carried on to ascertain if this was true of arecoline hydrobromide administered by mouth.

Chicken 20; ¼ grain, some tapeworm fragments passed first day; no other worms passed in 4 days; post mortem, 21 tapeworms (*Hymenolepis sp.*), 22 *Ascaridia perspicillum*, 50 *Heterakis vesicularis*, 2 *Gongylonema ingluvicola*. Treatment apparently entirely ineffective against tapeworms and the nematodes present.

Chicken 21; ⅛ grain, 1 *H. vesicularis* passed the first day; no

other worms passed in 4 days; post mortem, 7 tapeworms (*Hymenolepis* sp.), 7 *A. perspicillum*. Treatment entirely ineffectine against tapeworms and most of the nematodes present; removed all the heterakids (1) from the ceca.

Chicken 22; 1/16 grain; 1 *H. vesicularis* and some tapeworm fragments passed the first day; no other worms passed in 4 days; post mortem, 34 tapeworms, 1 *A. perspicillum*, 46 *H. vesicularis*, 8 *Tetrameres* sp. Treatment ineffective.

Chicken 23; $\frac{1}{16}$ grain; no worms passed in 4 days; post mortem, 12 tapeworms, 34 *H. vesicularis*, 4 *Tetrameres* sp., 1 *Cheilospirura hamulosa*. Treatment entirely ineffective.

Chicken 24; $\frac{1}{32}$ grain; 2 *H. vesicularis* the first day; no other worms in 4 days; post mortem, 10 *H. vesicularis*. No conclusions in regard to tapeworms; 17 per cent effective against the cecum worm.

Chicken 25; $\frac{1}{32}$ grain; no worms passed in 4 days; post mortem, 303 tapeworms, 16 *H. vesicularis*, 3 *Tetrameres* sp. Treatment entirely ineffective.

In the above experiments the administration of arecoline hydrobromide in doses of $\frac{1}{32}$ to $\frac{1}{4}$ grain to 6 chickens, 5 of which had tapeworms, removed some tapeworm fragments from 2 birds, but left a total of 377 worms. The treatment, therefore, promises nothing in this connection. It removed 4 *H. vesicularis* and left 156. Other nematodes were not affected.

Summary

Efficacy: Arecoline hydrobromide in therapeutic doses has an efficacy as an anthelmintic and as a purgative which is approximately comparable, apparently, to the efficacy of freshly ground areca nut in therapeutic doses. In general, the best anthelmintics for removing tapeworms do not show the same certainty of action that the best anthelmintics for removing nematodes do. The failure is commonly associated with a failure to remove the head. The exact reason why the head is so often left behind is not known, but in the case of Dipylidium it is probably associated with the burrowing habit of the worm and its tendency to sew itself into the intestinal mucosa.

Arecoline hydrobromide, in therapeutic doses, like the best anthelmintics for removing tapeworms, will sometimes remove all the tapeworms from dogs and will do this, probably, in the majority of cases (4 out of 7 cases in our experiments). In therapeutic doses it will sometimes fail to remove any tapeworms

from dogs, but this will happen, probably, in a minority of cases (3 out of 7 cases in our experiments). In excessive doses (1.5 to 2 grains) it may remove all the tapeworms present or as little as 37.5 per cent; conceivably it might fail to remove any under certain conditions. That arecoline hydrobromide may sometimes fail in practice as well as in experiments is indicated by some reports which have come to our attention and which are noted here. In view of the erratic action of anthelmintics for removing tapeworms, it would require a large number of critical tests to enable us to compare with any degree of accuracy the efficacy of arecoline hydrobromide with that of male fern, kamala and other drugs in this group.

Arecoline hydrobromide, like anthelmintics in general for removing tapeworms, shows much less efficacy in removing tapeworms from chickens than in removing tapeworms from mammals such as dogs. This may be due in part to the speed with which substances in general, and especially purgatives, pass through the digestive tract of chickens. Evidence as to the rapidity with which ingested material passes through the digestive tract of chickens has been published by Browne (1922) and more recently by Kaupp and Ivey (1923).

Safety. Arecoline hydrobromide appears to be a fairly safe drug for use in therapeutic doses for removing tapeworms. The doses of 1.5 to 2 grains given to dogs weighing 10 to 13 kilos have indicated safety factors of 6 and 8 for the therapeutic dose of ¼ grain for dogs of this size. We have not yet learned of the death of a dog from arecoline hydrobromide, and while this might occur, it would probably occur only exceptionally and in dogs highly susceptible, for some reason or other, to the effects of the drug.

The depressant effects of the drug are often quite marked, and the veterinarian's clients are sometimes unfavorably affected by the evidence of more or less depression, distress, vomition, etc. Some veterinarians are inclined to regard this as sufficient reason for discarding the use of arecoline hydrobromide. In our opinion, the factors of efficacy and safety are of more importance in the selection of drugs. It must be admitted that the effect on the client with its entailed effect on the business side of veterinary practice can not be overlooked, but should the veterinarian treat the patient primarily and the client secondarily, or the client primarily and the patient secondarily?

CONCLUSIONS

Like other good drugs for removing tapeworms, arecoline

hydrobromide will often remove all the tapeworms present. In our experiments this happened in a majority of cases where a therapeutic dose was given (4 out of 7 cases). It will occasionally fail to remove any tapeworms. In our experiments this happened in a minority of cases where a therapeutic dose was given (3 out of 7 cases). In some cases it will remove some tapeworms and leave others. In our experiments this happened once where an excessive dose (2 grains) was given. It will occasionally remove some roundworms, but has comparatively little value for this purpose.

Arecoline hydrobromide appears to be quite safe. It causes depression, emesis and catharsis, but animals recover rather promptly from its effects. The safety factor appears to be at least 8 and may be much higher. The safety may be due in part to the production of emesis.

In addition to its efficacy and safety, this drug has an advantage over most drugs for removing tapeworms in that its bulk is very small and it acts as a purgative, making it unnecessary to give purgatives in addition. It acts promptly and this prompt action makes a favorable impression on a veterinarian's clients.

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BIOLOGICAL THERAPEUTICS IN BOVINE HEMORRHAGIC SEPTICEMIA AND EQUINE INFLUENZA[1]

By W. P. BOSSENBERGER, *Williams, Iowa.*

In presenting this paper I have nothing new to offer regarding the causes of contagious, infectious disease, but in carrying out a large number of autopsies I have noticed many changes in the blood and other body fluids, and my findings in those changes have been considered worthy of mention for the benefit of others. I do not doubt that some of them have been noticed by other practitioners and my remarks may be uninteresting material to many, yet let us exchange our views upon this infection and hope that we may arrive at a better and more successful treatment.

Hemorrhagic septicemia, in its uncomplicated form, does not seem to be very difficult to treat, since we have the numerous and valuable biologicals at our command. Still, year after year, we come in contact with mixed forms, which offer the most stubborn resistance to any form of treatment. These mixed forms may vary from very light affections, which generally pass unnoticed by the owner, to those which are more serious and cause endless amount of anxiety to the practitioner.

This variation in virulence depends upon many factors possessed by the bacterium or by the animal. Among these we might mention the amount of immunity the animal has towards the infection, the virulence or pathogenicity the bacteria possess or are able to produce, and the sort of infection present. Bacteriologists have demonstrated by laboratory experiments that certain bacteria act as symbiotes with others, in some forms of mixed infections, thereby allowing or assisting one group or another to produce a much more powerful toxin than when existing in a single type of infection.

The more complex the infective agents are the more severe will be the course of the disease. Each group of bacteria produces certain forms of toxins, and these in turn have certain pathogenic effects upon the system. Should they exist in many forms, we can readily see why a combination of them has such rapid and fatal effects.

[1]Read before the North Central Iowa Veterinary Association, Fort Dodge, Iowa, May 28, 1923.

Before taking up the consideration of the effects of bacterial toxins let us consider the part nature plays in attempting to wall off the invaders. When gaining entrance to the body she calls upon the defensive forces, the phagocytes, to expel them or render the invading army powerless. This action can be studied by noticing the various catarrhal conditions and examining them microscopically. Here we find numbers of cells containing bacteria of various shapes and forms. When bacteria come in contact with mucous membranes they produce irritation, either by their motility or the toxins excreted, and nature at once sends out the defensive forces to allay that action. If nature is successful in these efforts, the animal soon recovers, but if the army is too powerful and breaks through the lines of defense, illness results, the degree of which depends upon the number of the invaders and the virulence of the toxins they are able to produce.

It seems as though the more virulent the infection is, the less action will the defensive forces have upon them. This can be ascertained by the condition of the bacteria contained within the cell, in that the lower the grade of infection the more distorted will be the microbe which it has ingested. Catarrhal conditions of the mucous membranes are brought about by any irritant and produce symptoms which frequently pass unnoticed by the owner. The animal may show only an inclination of slight depression, a craving appetite, a symptom which the owner usually considers a sign of good health, until the animal fails to maintain its body flesh, when he is informed of some faulty condition.

Microscopical examinations of the catarrhal exudate in those instances will fail to demonstrate any bacteria, or at the very most, a very scant number of them. Again, in irritations due to a non-toxic invader, there will be noticed an abundance of the large mononuclear leucocytes present, but when infectious irritants are present we notice more of the small polynuclears present. In highly infectious irritations we sometimes do not notice the catarrhal manifestations and only a slight mucous discharge, which I believe is nature's attempt to flood away the irritating material. Should she fail to do so, symptoms of illness rapidly follow, which is testimony of the invaders having overcome the resisting powers of the animal and that they have produced their effects upon the animal's cells, whether of the blood, lymph or nerves. When the bacteria produce an external,

or exogenous toxin, they are more capable of repulsing nature's efforts and can also gain entrance more rapidly. After having gained entrance into the body, they are not yet free to travel at liberty, as they then come in contact with still other antagonistic forces, such as the lysins, precipitins, agglutinins and various other bodies.

Some of those actions cannot be studied without laboratory facilities, but the agglutination can be noticed when making microscopical examinations, by the manner in which the bacteria are grouped together, that is, there are scarcely any or only very few free bacteria. This can also be seen by taking a sample of infective material and examining it and noticing how the germs exist in single numbers through the smear. Then take another sample, where treatment has been of short duration, and notice how the bacteria exist in clumps with very few free ones. After noting all of those changes they have caused me to alter treatments from those usually employed and which, I believe, are responsible for the more satisfactory results obtained from the use of the various anti-sera and other biologicals.

Not so very long ago I had demonstrated to me results which I can lay to my improper treatment. A number of cattle evidenced symptoms of hemorrhagic septicemia and I immediately gave an immunizing dose of hemorrhagic septicemia bacterin. The following morning six or seven of the animals were down, unable to rise. Several died the following day. Next day more were down and more had died, while still others were coming down with the disease. I saw in that herd the reaction of the bacterins, creating an aggravated form of the infection, which might have run a less severe and less fatal form, and I resorted to the more scientific treatment, that of preparing the system to accommodate a dose of bacterins, small as they were. I have long practiced the routine of *not giving bacterins to an animal showing symptoms of illness*, yet in a few cases I have violated this conclusion, to my sorrow.

In administering a dose of bacterins to an animal there is a call upon the defensive forces, and when the body is already laden with infective agents it generally has as much to contend with as it can, to hold the infection in check. Then along comes the veterinarian, who administers still more invaders and the defensive forces of the body are overpowered and the battle rages in its wildest form, causing death to the host. In carefully graduated doses the anti-sera produce more satisfactory results

and have been my routine treatment except in a few cases. Where I have transgressed from that line of treatment the results never have been as satisfactory, for some reason or another, and where loss did occur it can be attributed to that cause.

In the past year we have had on the market a drug of the aniline dye group, that will find many useful places in veterinary practice, as it is a powerful germicide, without any irritating effects. It can be administered intravenously as safely as it can be applied locally, with equally good results. In certain infections it is superior to the biologicals as the initial treatment, as it renders the bacteria less active through its germicidal activities, thereby allowing the phagocytes to act more readily upon invaders or their products.

As the toxins and medicinal substances introduced into the blood-stream are carried by the protein of the cells, I believe we should employ remedies that are so carried, in preparing the system for biological therapy. Sodium cacodylate is also a very valuable product to employ in such conditions and I frequently administer it with the anti-sera, with apparently very satisfactory results. Arsenic being a poison and carried by the cell protein, it at once inhibits or kills the toxin, without producing ill effects upon the patient. Large doses have been given at one time and repeated daily in serious cases with very satisfactory results. When this method has been omitted, very unsatisfactory results have followed, in the majority of cases.

As another illustration of the harmful effects bacterins will produce, when injected into an animal showing symptoms of the infection, let me cite a case where a number of horses had been shipped by rail from Keokuk to Blairsburg, in the spring of 1920. The owner, Mr. J. L. Neff, reported his horses ill several days after arrival and on arriving at the farm I found two down, unable to rise. Each of these received a dose of anti-influenza serum intravenously, one dying the next day and the other improving.

The balance of the animals each received a dose of bacterin and the next evening each and every animal that received bacterin became very stiff in all four feet. Typical symptoms of laminitis had developed in all of them except the animal receiving the serum treatment, which continued to improve rapidly. The owner, seeing that the animals which did not seem so ill, suddenly becoming very much so, placed the cause on the

treatment, as he was certainly entitled to do, even though I did not admit that fact before him. Heroic treatment was required to save those animals and each received anti-influenza serum intravenously for two or three daily doses, before there were signs of improvement. All recovered in good order, but I am satisfied that if I had not administered the anti-serum intravenously that they could not have resisted the action produced by improper treatment long enough to allow absorption from a subcutaneous injection.

This case in particular demonstrated to me the folly of administering bacterins to an animal that already harbors the germ, if you expect to obtain the most satisfactory results. I do not know that sodium cacodylate was much used at that time, and what I did have was in the form of a salt, which of course I dissolved in water, but never used it for intravenous administration. Perhaps if I had given it with the serum the results would have been even more satisfactory.

Have You Secured One New Member This Year?

VETERINARY STUDENTS AS EDITORS

A copy of the Veterinary Edition of the Rocky Mountain Collegian has come to hand. This was prepared and edited by the students of the Division of Veterinary Medicine of the Colorado Agricultural College, at Fort Collins, and they certainly did themselves proud. It is to be hoped that this edition of the Rocky Mountain Collegian was given wide circulation throughout the West, as the articles contained therein, on subjects relating to the veterinarian and his activities, give the finest kind of publicity for our profession.

Does Your Wife Know About The Women's Auxiliary?

R. O. T. C. HORSE SHOW AT M. A. C.

At the R. O. T. C. Horse Show, held at the Michigan Agricultural College, on Memorial Day, Miss Dorothy Giltner, daughter of Dr. Ward Giltner (Corn. '06) placed second in the ladies' saddle class. Dr. J. P. Hutton (O. S. U. '10) placed third in the gentlemen's saddle class. Several thousands of people from Central Michigan witnessed the Show, which is evidence that interest in good horse flesh is much on the increase. Prizes totalling $500 in value were awarded the winners.

THE TAPEWORMS OF A CAT[1]

By HOWARD CRAWLEY, *Philadelphia, Pa.*

The animal on which the following observations were made was taken in as a stray, in May, 1921, and since that time has been kept as a house cat, being allowed out of doors only at long intervals and then for a few minutes at a time. It has therefore never been in contact with other animals, either cats or dogs, and in consequence it seems fair to assume that all the parasites it has ever harbored are the descendants of those present at the date mentioned. At that time it was about four months old.

The kitten was readily taught to make use of a pan for its natural dejecta, and this procedure permitted observations to be made on the feces. In June, 1921, these were observed to contain tape-worm segments, and treatment was instituted. This consisted in the giving of mineral oil, after a period of fasting of about twelve hours, followed by powdered areca nut. In each case six grains of the areca nut were given, the animal at that time weighing about five pounds.

Three treatments were given, with results as indicated.

June 12, 1921	5 tapeworms passed
June 24, 1921	17 tapeworms passed
July 4, 1921	1 tapeworm passed
	3 *Belascaris cati* passed

On each occasion the tapeworms were passed about half an hour after administration of the areca nut. They were identified as *Dipylidium caninum*. In no case did they show the least signs of life, but were wholly normal in appearance. All of the chains were long, the longest measuring some 12 inches.

During the late summer of 1921 fleas appeared on the cat, and became quite abundant. They were not in evidence in the ensuing winter, but a few must have remained, for in July and August, 1922, the cat became badly infested, and from 50 to 100 fleas were picked off each day. An examination was made of the floors of the dwelling place and great numbers of larval fleas were found. These were destroyed by spraying their harbouring places with xylol. The presumption, as we have seen, is that all the fleas ever present on the animal were derived from those present in May 1921, and that they were continually present,

[1]Contribution from the Bureau of Animal Industry of the Pennsylvania Department of Agriculture. New Series No. 12.

although in winter in very small numbers.

After the treatment of July 4th, 1921, there was no evidence of the presence of tapeworms for about a year. But in July, 1922, the cat developed a diarrhea, and tapeworm segments were noted in the feces. On July 26, 1922, areca nut was administered, and nine tapeworms were passed, these ranging in length from one-half to three-quarters of an inch.

It was known that the areca nut used on this occasion had been ground for several years. In consequence, it was under suspicion of having lost its efficacy, and it quickly became evident that this suspicion was warranted. Tapeworm segments reappeared in the feces, which continued to be very thin, being about of the consistency of pea soup. This condition of the feces was credited to the presence of tapeworms but, as developed later, there is doubt that this is wholly correct.

The number of tapeworm segments increased, and on September 1, 1922, the cat was again dosed with areca nut, the amount used being twenty grains. As a result, 149 worms were passed. These were throughout small, the chains not being above 3 inches long.

The diarrhea continued and in a short time segments re-appeared in the feces. The number of these passed indicated that the infestation was heavy. Areca nut was once more given, the date being November 25, 1922. The administration followed a fast of 13 hours. The quantity used was 21 grains, and it was known that the material had only recently been ground. The cat at this time weighed between ten and eleven pounds.

Forty minutes later the cat passed a great mass of tapeworms containing, by actual count, 676 chains. Many of these, however, were very short, measuring from less than one-half to one and one-half inches. It was also noticeable that normal and normal-sized segments were scarce. There were a few chains perhaps 4 to 5 inches long, but in these most of the segments were small, with a disposition toward being misshapen. The characteristic 'cucumber-seed' aspect was not in evidence.

Attention should also be called to the fact that the 676 chains counted were not all that the cat passed. The treatment was apparently quite severe, and for the next hour the cat seemed to have a constant desire to defecate, passing frequently a small quantity of liquid fecal matter which on each occasion contained one or more tape worms. This was done wherever the animal happened to be at the time, and such specimens were lost. This

trouble was not noticed on any of the previous treatments and is probably due primarily to the greater freshness of the areca nut, although the very heavy infestation may have played its part. The animal was noticeably thinner after passing this mass of worms than before, which is after all not surprising.

Although there was no great expectation that the cat had been absolutely cleared of tape-worms, the diarrhea, after a couple of days, wholly ceased, the feces becoming normal. It was also noted that the cat's appetite fell off quite appreciably, doubtless as a result of being relieved of the task of feeding so many unwelcome guests.

For a time all went well, but after about a month segments again appeared. It is taken for granted that these came from worms which the treatment of November 25th failed to clear, and not from a fresh infestation. Fleas were probably still present, but in such small numbers that attempts to find them were almost always futile. Nor, as during the previous winter, did the cat ever show any signs of being annoyed.

Finally, January 28, 1923, areca nut was once more given. Only milk was allowed on the previous day, and nothing at all on the day the anthelminthic was administered. It was, however, given in the morning. The dose was 18 grains, or three grains less than the 21 grains administered November 25. As already noted, the after effects of the treatment had been severe and it was believed that a smaller dose would suffice. As a result, 19 tapeworms were passed, nearly all at one movement, 35 minutes after administration. The longest of these chains measured 7 inches, the shortest about one and one-quarter, but most of them were closer to the maximum than to the minimum.

It is to be noted from the data given that when the worms passed were few in numbers, they were of approximately normal length. On the other hand, in the two heavy passages, the worms were all small, this being especially noticeable in that of November 25, where many of the chains were less than a half-inch in length. The explanation, of course, is very obvious. It is merely a matter of room, and several hundred tapeworms in the intestine of a cat do not have the space necessary to allow them to produce chains of any length.

The dates of the several treatments, and the numbers of tapeworms passed on each occasion are here given:

June 12, 1921	5
June 24, 1921	17

July 4, 1921	1
July 26, 1922	9
Sept. 1, 1922	149
Nov. 25, 1922	676
Jan. 28, 1923	19
Total	876

We clearly have there a case of a vicious cycle. The animal is so closely confined to the house that it cannot be supposed that it has been reinfected from other cats. It is much more likely that the treatments of 1921 left one or more tapeworms within its intestine. The eggs of these, adhering to the region of the anus, were swallowed by fleas. These fleas with their contained bladder-worms, were then eaten by the cat. In this way the intestinal infestation was increased, yielding more eggs to be eaten by the fleas, and so on. It would be of some interest to ascertain if a cycle circle of this sort can perpetuate itself indefinitely, for it is at least possible that the constant in-breeding might have its effects on the fleas, or tapeworms or both.

But perhaps the most remarkable feature of the whole case was that, apart from the diarrhea, the cat did not show the slightest sign of being troubled. It has throughout been very active and playful, and during the winter, its fur is very thick and smooth. Moreover, although after the treatments of September 1 and November 25, the diarrhea ceased for several days, it again established itself, and it has more recently been found to be dependent on the diet. When only meat is given, the feces are normal, to become liquid after the feeding of milk for a day or two. While not denying that the presence of so many tapeworms had its effect, it is believed that the diet was the more important factor. For during the period when the tapeworms were so abundant, the cat was receiving milk as well as meat.

This apparent harmlessness of even a very heavy infestation of tapeworms may readily, of course, be an individual peculiarity and it would not be advisable to apply it to all cats. Moreover, and this is the more important point, it is applicable only to this particular tapeworm, *Dipylidium caninum*. Thus *Taenia crassicollis* (*T. taeniaeformis*), the bladder-worm of which is the familiar *Cysticercus fasciolaris* of the liver of rats and mice, is very dangerous to cats, and infestations usually result fatally. Other tapeworms are also at times found in cats, but not a great deal appears to be known as to their effects.

TECHNIQUE FOR THE TREATMENT OF STOMACH WORMS IN SHEEP[1]

By F. E. STILES,

Battle Creek, Michigan

Up until the present time I have been a little timid about recommending any medicinal treatment for sheep, because we thought it was such a task to give the treatment. I have devised a method, however, that seems practical to me in my work, and I am going to give you a sort of a case report, and outline the method I use in preparing and administering the treatment and the results obtained.

To begin with, the most prominent symptom of stomach worms, in the ordinary flock, is that the lambs, some of them at least, are not doing well and have a rough, dry coat. Occasionally, several of the lambs show a kind of swelling beneath the lower jaw, and diarrhea is a common symptom. The lambs which are badly infected are pretty badly soiled, posteriorly, as a rule. Emaciation is also noticeable. On those symptoms I think a man can base a pretty fair diagnosis.

Last year I had a client who brought in about 880 lambs, bought in the Chicago stockyards,—Ohio, Indiana, and Michigan lambs. A few days after they were brought home they began to tip off, two or three a day. My first impression was that probably it was due, in part, to the dipping received in going through the stockyards, because some of them showed quite typical lung lesions. I advised him to turn them into pastures where no sheep had been at all during the summer and where conditions seemed favorable. Still these lambs kept tipping off, even after several days. If they had had stockyards fever, it should have cleared up by that time.

To satisfy the owner as well as myself, I called upon our State Department and Dr. Clark came down. I had found a great many stomach worms in these sheep, and it was a question in my mind whether the trouble came from the stomach worms or from going through the stockyards. Dr. Clark was satisfied that the stomach worms were probably at the bottom of the trouble.

I used the copper sulphate treatment. I boil up about four ounces of copper sulphate in a pint of water, and that makes my

[1]Presented before the forty-first annual meeting of the Michigan State Veterinary Medica Association, East Lansing, Mich., February 6-7, 1923.

stock solution. This is added to three gallons of water. To the lambs I gave only one and one-half ounces. Before we got to treat the flock, about one hundred lambs had been lost. About seventy-five were weak and emaciated. They had to load them on hay racks and draw them in. I told the owner that about twenty-five percent of the 75 lambs would die anyhow, but only about ten or twelve more died after the treatment was started. Out of the balance of the flock, there was a carload of them sent to Detroit in the fall, to the Fat Stock Show, in December, and they took first prize and brought the owner the neat little sum of twenty-five cents per pound.

The way we proceeded in treating these lambs was to get them into the barn and crowd them up together. Then, with two men to catch them, one man holding and one man pouring the solution, I was able to treat about one hundred lambs an hour, and it did not make very much of a job at that. I took a funnel and had a piece of tubing attached to it. For a tip on the funnel, to put into the sheep's mouth, I used a metal, dose-syringe tip. In handling and dosing sheep, the man who holds the sheep should stand a-straddle of them and put his hands around the breast of the sheep and have him backed up against something. That will avoid struggling and will keep them standing squarely on the ground. After getting the solution ready, we had one man fill the funnel. First I started using a little stop-cock, but it was altogether too slow, so I just used my thumb. The man administers the medicine with the tube in his hand and the lambs will commence swallowing the solution. Then just stick your thumb over the end of the tube and withdraw it, and by that time another lamb is ready.

I treated about five thousand lambs last fall and had never treated any before that. I found this method very satisfactory. I tried some nicotine mixtures, with the copper sulphate, and could not see any difference. I tried giving some of them extremely large doses, but there were no ill effects. After treating this first flock, the man was so well pleased that he went to Chicago and bought about four hundred more. These were native lambs and we took from them about a dozen of the best looking ones, slaughtered them, and every one had stomach worms, some of them in large numbers. Then we treated the bunch and in thirty-six hours after the treatment we slaughtered another dozen lambs and only three of them showed any stomach worms and those only a few. After further treating we slaughtered

more, and found only a trace of stomach worms in a few of them. The lambs stopped dying.

At Bellevue, I treated some lambs and picked out about eighty which were emaciated. We left them by themselves until the next morning and had them tagged. The next day but one, after giving them the treatment, the man told me that the lambs had passed whole handfuls of worms. That led me to think that the worms must be tape-worms.

I would say to you, without any hesitancy at all, that the copper sulphate treatment for stomach worms in our native lambs just stands between profit and loss for the average farmer. It is so simple to give, and so cheap and efficient that I have become quite enthusiastic about it. You know that veterinary practice is changing so, unless we know a little about all these different things we are somewhat limited. Parasites seem to be very important and I would recommend this treatment.

There is one other thing which I might mention. If you go to the farm and examine some of these sheep and want to demonstrate the worms to the farmer, do not take a sheep which has died several days ago. Take a live sheep, bleed him and post him, and you can usually demonstrate the stomach worms. After the sheep has been dead a day or two you cannot notice the worms, as they will have been digested or have disappeared in some other way.

Plan To Go To Montreal, August 27-31.

BEAVERS A MENACE

Depredations of beaver in the Adirondacks region of New York have made necessary a law providing that the Conservation Commission be authorized to regulate the taking of beaver, in traps only, between March 1 and March 31. At one time the beaver was extinct in New York. A few were obtained and since then these forest rodents have multiplied so rapidly and have cut down so many trees and flooded so much territory that they have rendered valueless many large tracts of forest and farm land.—*Dearborn Independent.*

We Want 5000 Members This Year.

THE LOSS FROM ANIMAL DISEASE IS DIMINISHING[1]

By H. J. WATERS, *Kansas City, Kans.*

Managing Editor, The Weekly Kansas City Star.

Without stopping to make a definite reckoning, few of us realize the rapid progress that is being made in reducing the loss of livestock from disease. We need to go back only a few years to find an untrained, unscientific horse doctor as the only aid the farmer had when his animals became ill. The veterinarian of that time was a strange admixture of prejudice, superstition and tradition; the veterinarian of today is a practical scientist. Then when a highly contagious disease like hog cholera or blackleg broke out in the herd the farmer was totally helpless; all he could do was to watch his animals die. Now he calls a veterinarian, who administers a serum and the disease is under control. Better still, the forethoughtful farmer has his animals immunized before they become ill and these destructive diseases are held in complete check.

Fortunately in that earlier day our animals had plenty of room, our farms were infected to a less degree by diseases and parasites and there was less chance of contracting diseases than now. It is safe to say that if we had no better control of animal diseases and parasites today than we had then we could not maintain our livestock industry on its present intensive scale.

Illustrating concretely the effect of our progress in controlling animal diseases the year book of the Department of Agriculture for 1922, just off the press, states the annual loss of horses from diseases has been reduced from 22.3 per thousand in 1895 to 16 in a thousand in 1922. At this reduced rate of loss 150,000 fewer horses and mules die from disease in the United States a year now than died thirty years ago. Assuming an average of $50 a head as a conservative estimate the saving at this point alone amounts to 7½ million dollars. This saving is not made once in a lifetime, but every year, and it is growing greater because the losses are becoming smaller as time goes on.

Not all of this saving, of course, is due directly to the ministrations of the veterinarian, for the horseman has in the meantime acquired much knowledge of sanitation and provides better conditions for his horses and mules and feeds them more in-

[1]Reprinted from The Weekly Kansas City Star.

telligently than before. Yet this is another phase of the influence of veterinary medicine on farm practices.

In the loss of hogs from diseases and parasites the reduction has been even greater, as would be expected. In 1895, 92.3 hogs out of every thousand died of disease; in 1922 this loss was 54.4 a thousand. In 1896 the loss reached the high point of 127 per thousand and in 1911 fell as low as 41 a thousand. This means a saving of some 2¼ million hogs a year from death due to the complete control we now have over hog cholera and to better methods of sanitation. These hogs have a value on a conservative estimate of some 20 million dollars. Of more consequence than the aggregate value is the effect upon the individual hog raiser. Now that we can control hog cholera, the tenant farmer or the man of small means is able to raise a bunch of hogs without fear of losing them after he has invested his year's corn crop in them.

If all the savings caused by the practicing veterinarian were added together a staggering total would be reached. Of even more importance than this saving is the service of the veterinarian in conserving the health of the human family. It is not much to expect of medical science that the insidious disease, tuberculosis, may ultimately be stamped out of our country, but it cannot be accomplished without the help of the veterinarian. Be it said to the credit of the veterinarians that they have been leaders in the movement to make the United States free of tuberculosis.

We do well, therefore, to honor the veterinary profession. We do well to support generously the colleges educating men for this important profession, that they may be more scientific and more practical in their practices and that they may be of the highest type of citizen. We are merely promoting our own welfare when we give generous encouragement and support to the patient workers in the veterinary laboratories in the colleges and the Department of Agriculture where the discoveries were made upon which this new science is based and where discoveries are being made that will determine the progress of this indispensable service to agriculture.

Does Your Wife Know About The Women's Auxiliary?

INFECTIOUS VENEREAL GRANULOMATA OF DOGS[1]

By ALEXANDER GLASS, *Philadelphia, Pa.*

This disease was brought to this country about twenty years ago and was confined at first to English bulldogs. About this time there appeared a number of advertisements offering dogs at greatly reduced figures. On investigation, such imported dogs were found to be hopelessly affected with venereal granulomata. The disease gradually spread to the Boston terrier and played havoc with the stud dogs of this breed, and today it is found in other dogs as well, particularly the pointer and setter.

As this disease is perpetuated by mating infected animals and because of the enormous losses in high-priced dogs, it seems to the writer that some action should be taken by the regulatory authorities and kennel clubs to put this disease in the same category as other infectious diseases such as glanders, tuberculosis, etc.

In the male, the disease first appears as dark purple tumefactions on the body of the penis. These enlargements are unually circumscribed, although they occasionally may be diffuse from the onset. There is invariably a bloody but non-purulent discharge from the prepuce. This must not be confounded with preputial catarrh so common in many dogs that are over-fed and have little exercise.

As the disease advances, the tumefied growths gradually assume a granular appearance, become enlarged and bleed on the slightest touch. To reach this stage of advancement may require several months. The tumefactions are almost invariably sessile, although in the male they sometimes are pedunculated.

The disease may spread to adjacent parts, including the prepuce, perivaginal tissue, etc., and sometimes by metastasis involve the inguinal and other adjacent lymph glands.

The veterinarian should exercise the utmost caution in examining suspected animals, because occasionally—in the male particularly—there may be but one granulation which may often be situated so far back on the penis or hidden in the folds of the prepuce as to escape notice.

Such a condition may exist for months or even years; nevertheless the animal is a spreader of the disease during this time, because copulation is possible without pain.

[1]Reprinted from Univ. of Penna. Veterinary Extension Quarterly No. 10.

In the bitch the vaginal mucosa and underlying tissues in advanced cases may be so involved that finally cicatrical tissue brings about an occlusion of the passage so that it is impossible for copulation to take place. This condition may be readily determined by digital exploration.

The breeder's attention is sometimes first drawn to this disease in bitches—even when they are but slightly affected—by the male's refusal to copulate.

When the diagnosis is difficult or uncertain, inoculation of laboratory animals may be resorted to with definite results.

Histopathologically the disease shows a proliferation of the connective tissue, with many endothelial cells scattered throughout. The outer tissue is concentrically formed and contains epithelial-like cells and a few plasma cells.

It is questionable whether the tumor is a sarcoma or endothelioma, but most observers are generally agreed that it has none of the true characteristics of carcinoma.

As to treatment, the growths if they are of recent origin can be removed with the knife followed by actual cautery deeply applied. Adjacent enlarged lymphatics as well as large portions of the vaginal and penal tissue may be removed surgically, but a common-sense résumé of this disease leads to the conviction that surgical interference is useless and that animals so infected are never cured, but are always a menace to other dogs whether they are bred or not. Therefore it is obvious that all such animals should be destroyed.

ALEXANDER GLASS.

We Want 5000 Members This Year.

VISITORS AT THE JOURNAL OFFICE

Among those who have dropped in to see the Secretary-Editor during the past few weeks were: Dr. Edward A. Cahill, Laboratory Director, and Mr. F. V. Hawkins, Director of Veterinary Department, Pitman-Moore Co., Indianapolis, Indiana; Dr. M. J. Smead, of Rochester, Mich.; Dr. Joseph Hawkins, Dr. Daniel Marks, Dr. A. Stanley Schlingman and Dr. John Hoberg, all of Detroit.

Plan To Go To Montreal, August 27-31.

TRANSIENT PARALYSIS OR LEG WEAKNESS IN PULLETS[1]

By A. B. WICKWARE

Pathologist, Department of Agriculture, Ottawa, Can.

This affection takes the form of a weakness of the legs which in a few cases results in a complete paralysis of that portion of the body.

The disorder is principally observed amongst pullets, but other fowls may likewise be affected. Cockerels rarely, if ever, suffer from this condition.

Leg-weakness or what may be termed transient paralysis is particularly prevalent during the months of December, January, February and March and there appears to be a definite relationship between this affection and the heavy production of eggs which occurs at this period.

The usual history of an outbreak is that the owner, upon visiting the pen during the afternoon or evening, has failed to observe anything abnormal about his fowls. Upon entering the pen the following morning he is surprised to see a bird stretched out on the floor of the fowl house, occasionally making a determined but futile effort to stand upon its feet. The bird appears to be paralyzed, sometimes only one leg being affected, but in the majority of cases there is an involvement of both limbs. Upon being approached the affected individual beats wildly with the wings as it endeavors to get out of the way and in this fluttering it is frequently propelled for a considerable distance.

The fowls do not appear to be depressed but exhibit signs of considerable agitation when picked up.

In the majority of cases a complete recovery of nine out of every ten birds takes place in from 12 to 48 hours without treatment of any kind. Occasionally a fowl will remain in this paralytic state for a longer period of time and in our experience it has been found that where the condition persists for over three or four days a permanent paralysis results which resists all attempts at treatment.

Investigations have been conducted with the object of determining the exact cause of the trouble but very little information of a helpful nature has been acquired.

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[1]Reprinted from Canadian Veterinary Record, iv (1923) 2, pp. 123-124.

The most plausible theory is that of pressure upon the nerves supplying energy to the limbs by an unusually large egg or the continued irritation induced by a temporary stoppage of the egg in the oviduct. This theory is further upheld by the fact that fowls in this condition will recover almost immediately after laying. There are some cases, however, which do not appear to be dependent upon pressure as observations have shown that the fowls were not producing at this time. Possibly a few cases may be due to intestinal worms which exert their harmful effect when the strain of egg-laying has somewhat lessened the birds' resistance.

That the condition is not the result of forced feeding or the lack of some essential substance in the diet is apparent from the fact that leg weakness is transitory and fowls make a complete recovery without any change of diet.

There is possibility that a predisposition to leg-weakness is transmitted from a parent, subject to this disorder, to her offspring, but to eliminate or confirm such a suspicion, selective breeding would have to be carried on for a period of at least five years.

While leg-weakness at first sight is rather alarming, no great concern need to be felt by breeders, providing the birds appear to be vigorous and healthy and are laying well. The only thing one can do from a curative standpoint is to administer a teaspoonful of Epsom salts to each fowl after isolating her from the flock to prevent injury by the other birds. It is also advisable to cut down on the daily allowance of scratch grain and give a greater proportion of mash mixed to a crumbly consistency or even fairly moist.

When the condition persists for more than three days it is advisable to kill the bird and use the carcass for food purposes as there is nothing infectious or injurious in the flesh of such a fowl.

Have You Secured One New Member This Year?

The Veterinary Medical Association of the First District of Ohio has a committee working on the drafting of a new veterinary practice act for Ohio, the same to be submitted to the Ohio State Veterinary Medical Association, for approval, at the next annual meeting.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

ADENOLEIOMYOMATA IN A COW

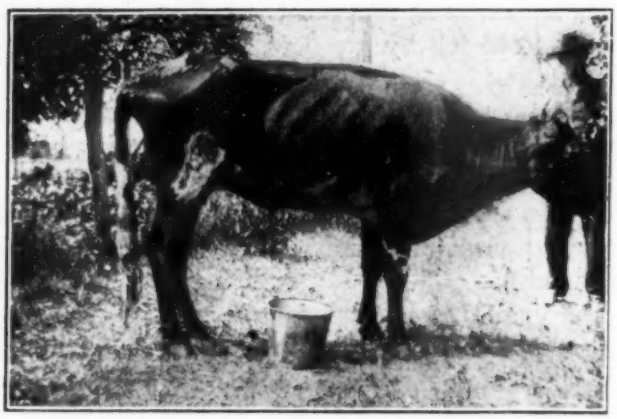
By R. A. CRAIG and L. P. DOYLE,

Purdue University Agricultural Experiment Station
Veterinary Department

Lafayette, Ind.

This case occurred in the practice of Drs. Smith and Scripture, Frankfort, Indiana.

The affected animal was a grade Jersey cow 7 years of age. The first symptoms noted by the owner were decrease of milk flow and loss of appetite. The attending veterinarian was immediately called, and two weeks later the writers were invited to visit the case. At this time the cow showed marked emaciation and weakness. Large patches of skin over the hips, lateral surfaces



Photograph of cow showing gangrenous area of skin in region of thigh and leg.

of the thighs and legs, and poll of head, had become gangrenous. The teats, eyelids, conjunctiva, and tongue also showed gangrenous surfaces.

The cow was killed and the carcass removed to a nearby reduction plant. The post-mortem examination showed the following:

The liver weighed 31 kilograms. This increase in size and weight was due to a large number of nearly-white, firm, nodular masses varying from 3 to 60 millimeters in diameter, scattered throughout the glandular tissue. These nodules, when cut through, were free from caseous material, and appeared dense with a few clear hyaline areas. The omentum and peritoneum, especially the parietal peritoneum, were studded with nodules similar to those in the liver. Here, however, none of the nodules exceeded 8 millimeters in diameter. The other viscera, and the visceral and body lymph glands were apparently normal.

Histologic Examination

Microscopic sections of the nodules from the liver, omentum, and peritoneum, showed the presence of a neoplasm of unusual structure, at least unusual in these regions of the body. In the tumors from all three sources the adenomatous feature was conspicuous. There were numerous acini or follicles lined with

Section of tumor from the omentum, showing the epithelial-lined follicles, separated by connective tissue interspersed with some plain muscle fibers.

cuboidal epithelium. Between the follicles in the tumors from the liver there was a preponderance of unstriped muscle made up of short, plump cells. The tumors from the omentum and peritoneum showed a preponderance of connective tissue between the follicles.

In the tumors from the liver there was a great deal of mucoid material that had evidently originated from degeneration of the epithelium of some of the follicles. While the epithelium of the follicles usually consisted of a single layer, there were areas in

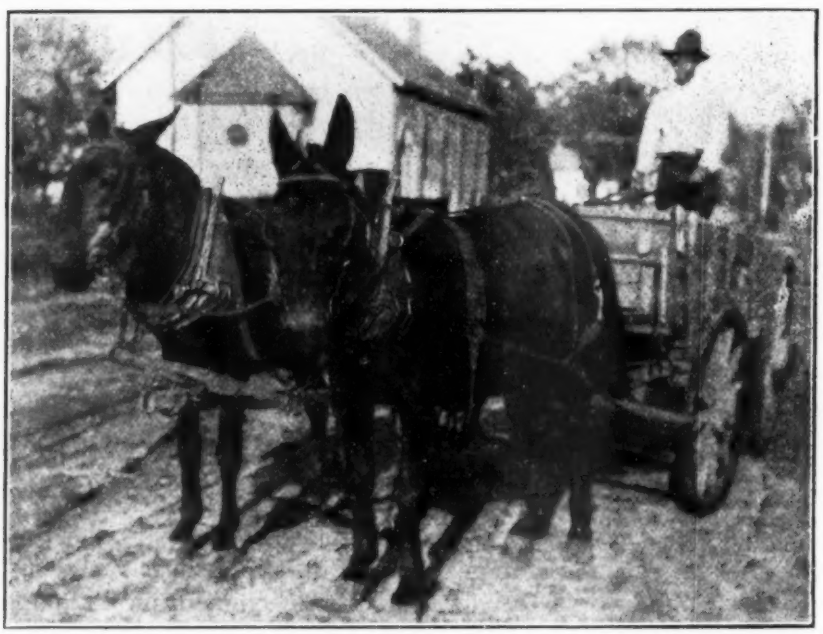
the tumors from the liver in which the follicular epithelium showed evidence of proliferation suggesting an approach to the carcinomatous stage. However, there was not any evidence of infiltration of the surrounding tissue.

Microscopic sections of the gangrenous tongue, skin, teats, and udder, did not show the presence of the neoplasm.

Does Your Wife Know About The Women's Auxiliary?

FORTY YEARS IN SERVICE

The accompanying photograph shows a remarkable pair of mules, Mag and Brag, broken at the ages of 3 and 4 years, respectively, in 1883. They have been in the possession of their present owner, Bill Malone, a drayman, of Augusta, Ark., all



these years. They are working together every day, and a J. I. C. bit is required for Brag. In the spring of 1919 an offer of $350.00 for this team was refused by the owner. Compare this sort of power with gasoline. Photograph kindly supplied by Dr. E. L. Kittrell, of Augusta, Ark.

REVIEWS

ENCYCLOPEDIA OF VETERINARY MEDICINE, SURGERY AND OBSTETRICS. Edited by George H. Wooldridge, F. R. C. V. S., M. R. I. A., F. Z. S., Professor of Medicine and Hygiene, Royal Veterinary College, London, etc., Two volumes. I, Veterinary Medicine; II, Surgery and Obstetrics. Pages 1106, 356 figures, 2 plates in color. Published by Henry Frowde and Hodder & Stoughton, London, 1923. $40.00

So far as we are aware, this is the first veterinary encyclopedia, so called, to come from the press. It appears to be intended to occupy a sort of middle ground, however, to perform a dual purpose, as it were. Such an impression of this work is obtained from a statement on the wrapper, to the effect that "the book has a wide appeal." Veterinary surgeons will find it an unfailing and trustworthy book of reference, ... To stock-owners and breeders it should prove of great interest and practical value, its language being, as far as possible, easily understood by non-professional readers." First impressions are apt to be most lasting. Perhaps the publishers fully appreciate this, but it is our opinion that the stock-owner and breeder will be more favorably impressed than the veterinary surgeon.

The material on the various subjects treated in this encyclopedia has been prepared by a large staff of collaborators, the names of many prominent veterinarians appearing in the list. Those best known to the profession in this country being Drs. M. Dorset and W. L. Williams, of the United States; Major C. G. Saunders and Captain E. A. Watson, of Canada; and Major Hobday, of England.

There are at least two qualifications, by which the value of a work of this kind may be measured, namely, completeness and up-to-date-ness. Perhaps we were unfortunate in applying our tests, but nevertheless, we did have two occasions to refer to this work, shortly after its receipt, and were disappointed in both cases.

An inquiry came for information concerning a disease existing in Panama, known locally as "derrengadera" or "murrina." Recalling a claim made for the book, "that all diseases occurring in foreign countries receive adequate consideration," we turned to the book for information concerning the Panama disease, but failed to find any mention of it. (In 1912, Darling published a

29-page account of this disease, which is a trypanosomiasis, in the Journal of Medical Research, with eleven illustrations.)

The next time we had occasion to refer to this work we wanted some information on the use of carbon tetrachloride in the treatment of hookworm disease. We were surprised to find that this drug was not even mentioned, in the pragraph on the treatment of ankylostomiasis, which is dismissed in fifteen lines, although a considerable bibliography is already available on the subject, one which has received much attention during recent years.

We did not wish to be unduly critical of this work, but in two practical tests in was found wanting. On the other hand there is a vast store of valuable information available. Whether it is possible, in this era of rapid scientific progress, to have an encyclopedia of this sort, which is worth the time, effort and money put into its preparation, is an open question. We rather favor the loose-leaf style of certain publishers, now in vogue in this country.

Whether such a work will supplant our standard texts and references on veterinary medicine and surgery is questionable. We reiterate our opinion that the present work will have a greater appeal for the stock-owner and breeder than the veterinarian. This is not to be taken as saying, however, that we place this work in the same class with other books which have been written primarily for this class of readers. It occupies a much higher level. It will not harm a veterinarian to have this work in his library. He will have many occasions to refer to it.

SCIENTIFIC FEEDING OF THE DOMESTIC ANIMALS. Martin Klimmer, Ph. D., D. V. M., Professor of Veterinary Hygiene in the Veterinary High School of Dresden. Third revised and enlarged edition. Authorized translation by Paul Fisher, B. S. A., D. V. M., formerly Professor of Pathological Anatomy, Ohio State University. 242 pages; 94 illustrations. Published by Alexander Eger, Chicago, 1923. Price $3.25, cloth.

There is no subject today, which the veterinarian has neglected to the same extent as feeds and feeding. We mean those subjects which properly belong to veterinary science, of course. The feeding of animals is something which frequently spells success or failure for the man who has invested his money in live stock, or who is converting his crops into cash *via* the live stock route. More so today than ever before.

Furthermore, if veterinarians are to reap the full harvest of their opportunities, they must command a certain knowledge of the relative values of the various foodstuffs, and be able to advise their clients intelligently upon the many phases of profitable and economical feeding. This book by Dr. Klimmer contains much of value along this line. It is a companion book to his Veterinary Hygiene, and prepared with the same characteristic German thoroughness and attention to detail.

The subject of vitamins receives very little attention, which is surprising, in view of the great amount that has been said and written on the subject during recent years. Perhaps it is the belief of the author that our domesticated animals have little to fear from avitaminoses. He says, "Harmful effects, as a result of deficiency in vitamins, occur now and then, but only in certain species of animals."

Another important subject which appears to have been slighted is the feeding of dogs. The grossest ignorance exists, at the present, as to what a dog should or should not eat. The subject of dietetics for canine patients suffering from various afflictions is an undeveloped field in veterinary medicine. Knowing the part diet plays in certain human diseases, typhoid fever for instance, may it not be that a large percentage of the fatalities from canine distemper is attributable to a lack of attention to this detail (diet) in the treatment?

The subject of dog biscuits is briefly discussed. It is stated that unless these biscuits are properly constituted, "Dogs nourished on these products for any length of time inevitably suffer in health (Hanslian)." On the other hand, "Dog biscuits of proper composition may be used as exclusive feed, but are not economical." A statement implies that the best way to feed dog biscuits is to soak them in water or broth before feeding, to which exception may be taken. Biscuits should be fed dry. They act as the dog's tooth-brush, in the dry state, and stimulate a more profuse flow of saliva, than when fed soft.

Section I is devoted to feeding stuffs and goes into their chemical composition, conservation and preparation. Section II treats of the principles of nutrition and feeding, contains rations for work animals, growing animals, milk, pork, beef and egg production, even feed for fish. There is a great deal of information that makes the book a valuable one for reference, for any veterinarian in general practice. It is a distinct addition to our literature.

THE PIG BOOK FOR BOYS AND GIRLS. William W. Smith, M. S. A. Professor of Animal Husbandry, Purdue University. 171 pages, 42 illustrations. Published by J. B. Lippincott Co., Philadelphia, 1923. Price $1.25, cloth.

This little book might be described as a short course on pig raising. It treats on a small scale, but in a systematic way, all the factors which contribute toward successful swine husbandry. The difficult problems are handled simply and efficiently. For instance, the subject of swine diseases is approached and disposed of in a way that will not be objected to by veterinarians. Lice, worms and scours only are referred to. The usual santonin and calomel combination is mentioned. Patent stock feeds, tonics and conditioners are said to be expensive and unnesessary.

The author advises that "If the pig is sick his trouble should be diagnosed by a veterinarian and his particular ills prescribed for," in which advice we concur. We do not endorse, however, his unqualified recommendation for the permanent immunization of pigs, by the serum-virus treatment, for the reason that there are localities in the country free from cholera, and several states forbid the use of virus in such territory. On the whole, the author has handled a difficult subject admirably well. Here is a little book that will make a nice present for that rosy-cheeked, freckle-faced farm boy or girl, the son or daughter of a particularly good client of some veterinarian.

REST AND OTHER THINGS. Allen K. Krause, A. M., M. D., Associate Professor of Medicine, Johns Hopkins University. First edition. Pages 159. Published by Williams & Wilkins, Baltimore, 1923. Price $1.50, cloth.

A collection of eight papers, written in the sympathetic style of the author. I. Rest. II. The Treatment of Tuberculosis. III. Sputum Infection of Children. IV. Adult Tuberculosis from Childhood Infection and Its Prevention. V. Antituberculosis Measures. VI. The Tuberculosis Problem. VII. The Elements of an Adequate Tuberculosis Program. VIII. Some Problems of Medical Education in Tuberculosis.

Although written from the standpoint of human tuberculosis, this book has its interest for veterinarians, particularly those engaged in tuberculosis eradication. How often does it happen that a veterinarian is approached by some timid member of the household, during a short stay at the home of the owner of a herd under test, and is asked questions about tuberculosis, that

would not be asked of the family physician. The veterinarian is looked upon as an authority on this disease, and he should be posted on all phases of it. Get this book and stick it in your pocket. It will make interesting reading between spells.

ABSTRACTS

SAFETY OF LOCAL ANESTHETICS, WITH PARTICULAR REFERENCE TO COCAINE AND BUTYN. Carl Nielsen and John A Higgins. Jour. of Lab. and Clin. Med., VIII, 7, April 1923.

Butyn having been demonstrated superior in efficiency to cocaine and procaine, the authors conducted a series of experiments with a view to comparing the toxicity of butyn to that of cocaine. These tests involved the subcutaneous injection of the drug into white rats, its subcutaneous and intravenous injection into rabbits, cats and dogs, and its oral administration to cats. Further, comparative tests to determine the effect of the two drugs on blood pressure and respiration were made.

A vast difference in relative ratio of toxicity of these anesthetics, according to the animals used and the mode of administration, was noted. Using cocaine as a standard for toxicity, it was found that butyn administered subcutaneously was twice as toxic as cocaine for rats, 3 2/3 times as toxic for rabbits, about equal in toxicity for cats, and slightly less toxic than cocaine for dogs. Butyn given intravenously to rabbits, and intravenously and orally to cats, appeared about equal in toxicity to cocaine. It is pointed out, however, that the apparent variation in the ratios of toxicity of butyn compared to cocaine, is due mainly to the great variation in toxicity of cocaine for various animals, and the conclusion is reached that the safety of a local anesthetic for human use should not be measured by comparison of its toxicity with that of cocaine on experiment animals.

In determining the toxicity of a local anesthetic, the authors conclude that it should be tested on as many different species of animals as possible, preferably the higher experimental animals, and that its toxicity should not be measured by comparison with cocaine as a standard without taking into consideration the fact that cocaine is highly selective in toxicity, bearing in mind that the higher the development of the brain of the animal, the more toxic is cocaine. The comparative variation in toxicity, depending upon the species of animal, mode of administration, concentration of solution, rate of injection, rate of absorption, as well

as the comparative action on blood pressure and respiration, should be considered. Then, with these data in mind, it is concluded that final judgment on the safety of the drug should be passed only after sufficient clinical experience with it.

The authors also investigated various drugs for their detoxicating action in the treatment and prevention of poisoning from local anesthetics of the "cocaine group." They obtained excellent results from the use of pituitary extract and indicate that small doses of pituitary extract, administered simultaneously with the anesthetizing agent, should prove an important adjunct. In treating cases of poisoning from anesthetics of the "cocaine group" the pituitary solution should be administered intravenously. In experiments on dogs, reported by the authors, high sublethal doses of butyn, which, if administered alone, would have caused marked symptoms of poisoning, were tolerated with but little discomfort when given with 1/100 to 1/45 of a cubic centimeter of commercial pituitary solution.

R. A. K

TAPEWORM PARASITES OF DOGS IN THE PUNJAB. G. Sondhi. Parasitology [Cambridge, Eng.], XV, 1, March 1923, pp. 59-66, text figs. 1-3, pl. II, figs. 1-5.

This paper is based on material collected from pariah dogs in Lahore, India. The species reported are as follows:

Dipylidium walkeri Sondhi, 1923. Head 263-361 μ in diameter with rostellum invaginated; 185 μ with rostellum evaginated. Rostellum elongated, 63-100 μ in diameter, with 6 to 7 alternating circlets of rose-thorn shaped hooks. Hooks gradually decreasing in size from anterior to posterior row; anterior up to 12 μ long; posterior as little as 2 μ long. Suckers circular, 118-150 μ in diameter. Neck short. Strobilus thin, 10-28 cm. long. Mature segments at least three times as long as wide; gravid segments 4.5-.8 cm. [misprint for 4.5-8 mm.?] long by 1.5-2.5 mm. wide. Genital pores slightly pre-equatorial in immature segments; equatorial or slightly post-equatorial in mature and gravid segments. *Male genitalia:* Approximately 225 ovoid testes in each mature segment, occasionally extending lateral of longitudinal excretory vessels, absent from a small anterior area, and few, 10-15, in field between pairs of female genital glands. Cirrus 45-54 μ long by 14-21 μ wide. Cirrus pouch may or may not extend to lateral excretory vessels. *Female genitalia:* Ovaries diffuse structures extending from level of genital pores to vitellar-

ia, and divided by vagina into a larger inner and a smaller outer lobe. Each vitellarium has the appearance of a bunch of grapes and is usually larger than the outer lobe of ovary. Egg capsules contain 1-15 eggs and extend beyond lateral excretory vessels, with a clear area anteriorly and a smaller one posteriorly. Eggs approximately 35 μ in diameter; the shell 4 μ thick.

Dipylidium sexcoronatum. Sondhi finds over 200 testes in this species, previous writers reporting 130-140. This species has been previously reported only from Hungary and the United States. In a footnote Sondhi reports it from dogs in England.

Dipylidium oerleyi. This is the first record from the dog and the first from India, the only previous record being from the cat in Hungary. Specimens from the dog are 9.5-21.5 cm. long; specimens described by von Ratz from the cat were 5-11 cm. long. This species was less common in Lahore than the 2 preceding species of *Dipylidium.*

Multiceps multiceps. Sondhi finds that genital primordia first appear as small dots in twenty-fifth segment; he finds 120-150 testes, previous writers reporting 200; the base of the vitellarium rests on the transverse excretory canal [See comment on *M. gaigeri,* below]; the vagina in passing between the ovaries crosses the uterus in about half the segments.

Multiceps gaigeri. In mature segments Sondi finds approximately 160 testes, not 200-225 as described by Hall; the base of the vitellarium rests on the transverse excretory canal. [This relationship may be modified by the degree and direction of pressure in mounting specimens. This is the first record, apparently, of the adult worm in natural infestations, the adult worms originally described being developed by experimental feeding of larvae to dogs. M. C. H.]

Multiceps serialis. [By a printer's error this appears in Sondhi's article as *Mutticeps serialis.*] Sondhi notes that Gaiger and Southwell reported this species from India, but that Hall regards their specimens as *M. gaigeri.* [Their specimens of larvae from goats must be so regarded; Southwell's specimens from the dog in Ceylon may have been *M. serialis.*] Sondhi thinks *M. serialis* is not uncommon in India and says: "The prevalence of the wild hare I think indicates the possibility of its being the intermediate host."

Taenia hydatigena. Sondhi states that the testes extend inward dorsally to the outer borders of the ovaries, between the

ovaries and the vitellarium, and dorsal to the vitellarium. A fairly common species in India.

Taenia ovis. This species was found in one animal. [This is the first report of the adult tapeworm in a natural infestation, the only other report being Ransom's cases of the development of the adult worm by experimental feeding of the larvae. M. C. H.] It is the first report of the species in any stage from Asia.

Echinococcus granulosus. The adult tapeworms were found in one dog.

M. C. H.

STUDY OF AN ORGANISM RESEMBLING BACT. PULLORUM FROM UNABSORBED YOLK OF CHICKS "DEAD IN SHELL." F. R. Beaudette, L. D. Bushnell and L. F. Payne. Jour. Inf. Dis. XXXII, 2, 124.

The attention of the authors was called to the fact that a large percentage of eggs under artificial cultivation at a poultry plant failed to hatch. This condition was known to exist generally in all such establishment.

Thinking, perhaps, that a condition existed in this plant similar to that described by Pernot, of the Oregon Agricultural Experiment Station, they made a bacteriologic study of the problem.

They were able to isolate, from the unabsorbed yolk of some of the chicks "dead in the shell," an organism closely related to members of the colon-typhoid group and which can not be distinguished from *Bact. pullorum* by fermentation reactions, except by the inconstant reaction of the latter on maltose and xylose.

They also found the organisms to be constant in eggs from the same hen which suggests the possibility that the hen may be a chronic carrier of the infection.

From their experiments, this organism and other members of the colon-typhoid group appeared to be pathogenic for developing embryos.

S. S.

During the year 1922, approximately 103,000,000,000 pounds of milk were used in the United States, in the production of butter, cheese, ice cream, milk chocolate and other milk products. A little less than one-half this amount, 47,000,000,000 pounds, was consumed as milk. This is about 945 pounds of milk, in some form, for each man, woman and child in the United States.

(*Continued*)

LARGE-ANIMAL CLINIC

THURSDAY MORNING, AUGUST 31, 1922

(*Continued from p. 387 May Journal*)

CHAIRMAN KINGMAN: We will now listen to a few words from Dr. Eichhorn, regarding "Swine Erysipelas." Dr. Eichhorn. (Applause).

DR. EICHHORN: Swine erysipelas, while a very important disease abroad, occurring practically in every country of Europe, has only in a very few instances been found to occur in the United States. However, in the last few years the etiological factor of the disease, which is the *Bacillus erysipelatis suis*, has been isolated from chronic cases and more recently also from acute cases of young pigs, by investigators of the Bureau of Animal Industry and others. It is difficult to state to what extent the disease is prevalent in this country. In view of the more recent isolations, however, there is a possibility that this disease may become of very great importance to the hog industry of the United States, just as it is at the present time in the European countries.

It is rather unfortunate that the differentiation between swine erysipelas and some of the other infectious diseases of hogs is somewhat difficult. Especially is this the case in the acute form of erysipelas. We are even now confronted with certain difficulties in differentiating the various swine diseases, and with the mass of written material at hand, and also in spite of the frequent and thorough discussions at the various meetings, on differential diagnosis of swine diseases, the practitioner is even now at a loss to make definite differentiation. Therefore, if, with all the confusing material, swine erysipelas would also enter into the problem, it would cause even a greater confusion than exists at the present time.

The group of organisms to which the causative factor of swine erysipelas belongs includes also other pathogenic organisms, one of these being the bacillus of mouse septicemia. This particular

strain is so close to the swine erysipelas organism that it is almost impossible to differentiate it bacteriologically and biologically. Furthermore, it is an established fact that at times the mouse septicemia organism, when inoculated into hogs, may produce typical forms of swine erysipelas, and therefore, there exists the possibility that under favorable conditions the mouse septicemia organism may change into a true swine erysipelas type. The possibilities of such occurrences were pointed out by several investigators.

It has also been established that the swine erysipelas organism is often present in normal hogs as a saprophyte, and under favorable conditions may become pathogenic, when it may cause outbreaks of the disease with the usual great losses which follow the infection.

The symptoms of the disease vary, depending on the type of the infection. There are three distinct forms recognized and which are absolutely distinct; the urticaria form which is commonly known as "diamond skin disease." Those who had experience in abattoirs in the United States no doubt have seen this form, but it has never been recognized as a type of swine erysipelas and always has been considered as an urticaria, or "diamond skin disease." The second type is the chronic form, which is manifested as a verrucose endocarditis; whereas the third type is the acute form.

Depending on the type we have to deal with, the symptoms vary. In the urticaria type we have typical rhomboid-shaped urticaria-like eruptions on the skin. The animals affected with this type usually manifest only slight symptoms for twenty-four hours after the first lesions appear. This form is not severe and the mortality is practically nil. The animals usually recover in from three to five days. The chronic form which usually follows the acute type after the animal shows an apparent recovery manifests itself in a pronounced weakness of the animal, which shows even on moderate exertion, very pronounced dyspnea.

The acute form is of the greatest importance for the veterinarian, inasmuch as the mortality from this type of infection is practically the same in European countries as from hog cholera in the United States. It is not uncommon to observe losses of from 60 to 80% in infected herds. The animals usually die in from three to five days after the first manifestations of the disease. The period of incubation is practically the same as in hog cholera. In the natural infection it is usually from three to

five days after exposure. The symptoms which the animals manifest also simulate those of hog cholera—weakness, exudate and edema of the eyes, eruptions on the skin and also reddening of the skin. However, the reddening of the skin is not the same as the discoloration in hog cholera. In hog cholera the reddening of the skin is due to distinct hemorrhages; whereas in swine erysipelas the reddening is due to the filling of the lymph spaces with serous exudate, in which the red blood corpuscles have been disintegrated, and therefore, if pressure is exerted with the thumb on the reddened spots on the skin of swine erysipelas, the reddening disappears because the reddening is not due to true hemorrhages. On the other hand in hog cholera the reddening remains, because of the true hemorrhage under the skin which cannot be dislodged; this condition being one of the important differential points between swine erysipelas and hog cholera.

As a further differentiation, hog cholera as you know has a tendency to run a more or less prolonged course. Only in exceptional cases do animals die in less than five days, but very frequently the disease runs into a subacute form with severe intestinal manifestations and pulmonary involvement which is only very exceptional in swine erysipelas. As a further differential point, on post mortem examination, we have in hog cholera the typical hemorrhages, particularly in the form of petechiae in the kidneys, on the serous membranes, etc. Whereas, in swine erysipelas, the hemorrhages are diffused, if there are any at all, and in the kidneys we have not the hemorrhagic petechiae but we have indications of a typical nephritis, that is, the whole cortex of the kidney appears darker, without the characteristic hemorrhages.

On careful observation and from postmortem examinations of the carcass, it is not very difficult to differentiate between hog cholera and swine erysipelas and it is advisable for the veterinarians to bear in mind the possibility of the occurrence of swine erysipelas and to be on the lookout for the infection. However, it behooves us not to get alarmed, especially so as we are already very much confused in regard to swine diseases, and unless we learn from authentic sources of the more frequent occurrence of swine erysipelas in this country, I do not think that veterinarians should be greatly concerned with this infection.

With regard to the control of swine erysipelas, the principles of sanitation and prophylactic vaccination are of the utmost importance. In Europe, for many, many years (I should think

for about twenty years), they have been practicing prophylactic vaccination against swine erysipelas, which consists of a simultaneous injection of immune serum together with a suspension of active cultures of the *Bacillus erysipelatis suis*. This simultaneous vaccination is very effective. So much so, that when swine erysipelas occurred very extensively in Saxony the government conducted a campaign of vaccination and guaranteed every animal against the disease after vaccination.

There is another point which I think is essential to bear in mind and that is that the disease occurs usually in young hogs; hogs over a year old are very rarely affected with swine erysipelas. Likewise, suckling pigs are not susceptible. The serum used for vaccination is produced from horses; therefore, it is very simple to produce it and only small doses are administered. The dose per hog varies from 10 to 20 cc together with ½ to 1 cc of the culture, and this vaccination is considered very effective against the infection and is now practiced in every country where the disease is prevalent.

I thank you. (Applause).

DR. SCHWARZE: Now, gentlemen, here are the organs of these animals we just posted, and you will find one of them shows edema, quite marked in the lungs, with circumscribed pneumonic areas very similar to what you sometimes find in parasitic pneumonia. Also more or less of a bronchitis, with muco-purulent material present.

Here is the other specimen, and it shows a lung where you have more or less pneumonia present and a slight edema. You will also see the petechiae, which are very characteristic.

DR. EICHHORN: This specimen shows the form of swine erysipelas which has been observed in the United States quite frequently. The chronic form, that is, the verrucose endocarditic form, has also been observed on many occasions. In this particular specimen, however, you will note the typical rhomboidal form of eruptions on the skin. You may further observe that the reddening is not uniform as yet, but as the process continues the center becomes pale and as the healing advances the skin on the affected part becomes covered with a crust. The organisms have been isolated from such skin lesions and also from the chronic forms of swine erysipelas in this country.

CHAIRMAN KINGMAN: Dr. Hoskins has an announcement to make.

DR. HOSKINS: Turn to your programs and note the Section

on Sanitary Science and Police. Professor Smith, who was to speak first, cannot be with us tomorrow, and through the kindness of Dr. Kingman we have arranged to have Professor Smith deliver his address here this afternoon.

CHAIRMAN KINGMAN: Dr. Hart will discuss "Swine Paralysis." Dr. Hart.

Dr. Hart: I don't feel very well qualified to discuss this subject. The only reason for my substituting for Dr. Fitch is because we have a considerable amount of this disease in California, and because we have been particularly fortunate, for the last eighteen months, to have Dr. Robert Jay with the Station, working on hog diseases. He is the representative of the Bureau of Animal Industry doing educational hog cholera control work, but as every one knows, Dr. Jay is interested in every disease that has anything to do with dietary trouble.

We believe swine paralysis is a dietary trouble. I have used that word advisedly, because the word dietary in this sense covers a variety of conditions—certainly three. One of these is the over-feeding of animals with ordinary nutriment, carbohydrates, proteins and fats. We know that the hog increases its body weight faster than any other of our ordinary domestic animals. It is born weighing three or four pounds, or less, and in the course of ten months it weighs two hundred pounds. Therefore, it increases its body weight fifty to one hundred times in this short period. Its cells are, therefore, extremely susceptible to stimulus by food. This may have something to do with this trouble in hogs. It is one form of dietary trouble.

Another form of dietary trouble is the mineral intake and outgo. This is particularly important in dairy cows, and those men who are studying mineral metabolism tend to consider all dietary troubles to be due to mineral deficiency.

Then, we have the third form of dietary troubles, known as true deficiency diseases, which are due to lack of one of the vitamins. Just which one of these conditions is the cause of swine paralysis we do not know, and we do not know that any of them is the entire cause, but evidence is certainly accumulating that these factors, one or all of them, have considerable to do with the development of this disease.

Dr. Jay is very strongly of the opinion that he can stop swine paralysis without any difficulty in herds, and he is having remarkable success in the field in California, although he hasn't carried on experimentation, nor made field observations to the point that

he knows which one of these dietary troubles is the cause of the condition.

We know, for example, that in the raising of hogs, the swine husbandry men are particularly careful that there shall not develop leg-weakness or the condition termed "low in the fetlocks," as this excludes the hog from winning in the live stock shows. Therefore, they feed these hogs calcium phosphate and bone meal when they are fitting them for show, if there is a tendency for the animal to show leg-weakness, because these substances have been recommended as curative agents for this trouble in hogs. Some men, therefore, on account of the fact that animal husbandmen have used bone meal and calcium phosphate for a considerable length of time, are of the opinion that paralysis of the hind legs is simply an extension of that condition common in the swine industry and termed "low in the fetlocks." That is purely a theory. The use of calcium phosphate and bone meal has been successful in some cases under our observation, but we are not prepared to consider that that was the cause of the change in the condition or the reduction in the number of cases.

The overfeeding of ordinary nutriment to hogs, when nutriments are plentiful, or when the owners are trying to crowd the hogs rapidly, is the period of time when we seem to have more hog paralysis than under other conditions. Dr. Jay rather favors the idea of cutting down on excessive protein feeding, in the herds where they have this condition to a large extent. It is fortunate that not a large percentage of the hogs have this disease and the losses from it are not devastating in the general run of cases. We have, however, herds in which the losses are very serious and render absolutely impossible a continuation of the swine business under those conditions unless a change can occur.

We are not prepared to say which one of these things may be the cause of this condition, and just how to proceed to cure it or to stop the development of it. I don't think any one has had very much success in curing hogs that are affected with the disease and we, therefore, in ordinary animals, that show evidence of this disease, recommend slaughter as soon as possible in order to get their pork value from them, because there is practically no change in the meat in the early stages.

After the disease progresses, there has been another change reported and that is edema of the nerve trunks. We have not

sectioned any nerves of hogs, since we were in a position to recognize the presence of edema if it existed. We have sectioned the spinal cord and nerves of hogs infected with this disease years ago, when we did not have the ideas in regard to it that we have now, and while we did not find any definite pathological lesions at that time (not looking for conditions which we would look for today) we might have overlooked a pathological change, if it were present in the nerves, consisting of edema or other slight changes.

Dr. Schwarze has the history of these hogs. I don't know that there is anything to be brought out in it. I think everybody has seen this condition, but I would like to have Dr. Schwarze give the history anyway.

DR. SCHWARZE: There were two litters of these pigs that were farrowed the middle of January, 1922, and these pigs here are from each litter. They are not inbred animals, however, but crossbred. They first took sick about April 15th, and one that took sick has recovered and three of them never contracted the disease. There were fourteen pigs in the two litters, and ten of them developed this paralysis.

The pigs that were not affected with this condition at the present time weigh over two hundred pounds. They all have a good appetite and they seem to squeal a great deal, especially at the beginning of the attack. They were first fed corn, skimmed milk and green grass. That was when they took sick. After they developed this condition they were fed tankage, oats, corn and whole milk, without any results. That is all the history I have on the condition.

DR. HART: It is peculiar, when a veterinaruan is trying to find out the feed that hogs are receiving, in herds where dietary troubles are suspected, how difficult it is to get from the owner all the feeds that he is giving the hogs. Dr. Jay makes a specialty of getting this information and any hog owner that doesn't give him all the information about what he is feeding will have very little chance of getting by with it, because he will walk all over the ranch until he finds the place where the owner is feeding something that he has not told him about. It is surprising what a large number of hog owners will pretend to think that they are not feeding their hogs nearly as much as they are. There are other cases in which the owners will be feeding their hogs a great amount of a small variety of foods.

These are two things that Dr. Jay particularly looks for, and

has been successful. I would say he has been very successful in field work in stopping the further development of these cases. Certainly he has placed us in a position that we don't have the same discouragement in going out to help owners with this trouble that we had before he came out there with us. The only thing that we know to do is to see that hogs are not overfed, and to see that they have sufficient variety, that in case it is vitamin deficiency, the variety will be great enough to get in at least the important fat-soluble A and the water-soluble B vitamins. I think that is all I have to say. (Applause).

CHAIRMAN KINGMAN: Dr. Schwarze wants to call your attention to some factor regarding this pig here.

DR. SCHWARZE: You will all observe the breathing of this animal. This animal was shipped in by express and he has developed that condition of which I was speaking to you, in those hogs that we posted. It shows very typical symptoms of that condition and if you open him you will no doubt find those lesions that are quite common.

QUESTION: How do you account for that?

DR. SCHWARZE: Just some exposure of some kind. Its vitality was lowered some way or other. It has been moved from its natural habitat, the environment has been changed, and it just simply seems to lower the resistance and has a tendency to develop that condition.

QUESTION: What is your name for that condition?

DR. SCHWARZE: I am not naming it. It is interesting and is the condition we find in hogs being shipped.

QUESTION: What is the pathological lesion of his lungs now?

DR. SCHWARZE: They may be on the same order of those you saw going there.

There is one thing: If these cases run along any length of time you will get a distinct pneumonia. It is mainly an edema now, but give them time enough to develop and you will have a pneumonia.

QUESTION: Is there any treatment for that condition?

DR. SCHWARZE: I would not know what to say. There have been a lot of treatments prescribed—bacterins, serums, etc. I am not in a position to comment on that.

QUESTION: How long would it be before pneumonia developed?

DR. SCHWARZE: Quite rapidly. In four or five days.

We are not in a position to say what the mortality is. Sometimes it is low and again it is very high. It runs anywhere up

from five percent to seventy-five percent.

DR. FERGUSON: Are there any material changes in the petechiae, or in the leg bones in that condition?

DR. SCHWARZE: In the coloring of it?

DR. FERGUSON: Is there any excess of animal matter in the make-up of the bone?

DR. SCHWARZE: You are talking about paralysis. I do not know anything about that. I have never studied it; no man knows less about paralysis than I. Dr. Hart probably could tell you more about that.

CHAIRMAN KINGMAN: We will open up the question box for just a few minutes, so you may ask Dr. Cahill or Dr. Schwarze or Dr. Joss, any of the questions that you have in mind.

DR. HASTINGS: I would like to ask Dr. Joss a question.

Do healthy hogs show cholera lesions after double treatment? If they do, how long?

DR. JOSS: I believe in vaccinated animals you might possibly find some of the petechiae in the kidney, and maybe a few in the bladder, as late as the tenth or twelfth day, following simultaneous treatment. I might answer that question a little more to the point in regard to the hyperimmune. The regulation is that they shall not be killed earlier than ten days subsequent to the date of hyperimmunization, because you will find lesions in the bladder and kidneys if you do, although those hogs have normal temperatures and they are apparently all right.

After the tenth day they will probably all disappear in normal hogs.

DR. HASTINGS: What abnormal conditions do you find?

DR. JOSS: Nothing out of the ordinary in seven-day pigs. I know that to be a fact, because in accidents, sometimes, when a pig gets killed, you will find petechiae in the bladder and the glands slightly congested, yet those pigs are apparently in a normal condition.

DR. SIMMS: Dr. Hart, I would like to ask if you have any evidence that the absence of vitamins is concerned with this paralysis we see in hogs? It seems that our observation has shown we have just as small a percentage of cases where the food contains all the vitamins necessary, as we have where the foods are short in vitamins, and I am asking this question because it seems to me that we as veterinarians are becoming quite enthusiastic in the use of vitamins, or in the diagnosing of diseases where we do not have any evidence that the lack of vitamins is ordinarily

concerned. It is a well established fact, of course, that we can produce certain diseases from lack of vitamins, but you will notice, gentlemen, that we always select in our experimental work those animals which are especially susceptible to the lack of vitamins.

We select the pigeon to produce the neuritis lesions, the rat for absence of the fat-soluble, and the guinea-pig for scurvy. Those animals are susceptible to those diseases and our domesticated animals which are ordinarily raised on our farms are not so susceptible, and experimental evidence usually points to the fact that these diseases are negative rather than positive in cattle and horses, and probably in hogs. I am saying this just because I feel that we have gone crazy on the subject of vitamins.

DR. HART: I think that the statement of Dr. Simms is very well taken. We have absolutely no evidence that vitamin deficiency alone will cause paralysis in hogs. That is the reason I have carefully used the words dietary trouble, rather than deficiency trouble, because deficiency trouble is a restricted trouble, due to lack of one of the secondary dietary essentials.

We haven't direct evidence that the other conditions are the cause of paralysis in hogs, but we have certain factors shown in regard to the development of the cells of the hogs, with the rapid increase in the animal's weight, that offers a possible opportunity for this animal to become susceptible to dietary troubles more than some of our other species of domestic animals. We are of the opinion that it may be classed as a dietary trouble, but not necessarily a deficiency trouble.

CHAIRMAN KINGMAN: Are there any other questions?

Will the horse clinic be ready at one o'clock?

DR. RIVES: Yes.

CHAIRMAN KINGMAN: You understand that the tuberculosis carcasses will be exhibited following the horse clinic, that the program has been changed in that respect, and that Dr. Merillat will appear at one o'clock, until three, and we will be guided then to Armour's to see the tuberculosis carcasses.

Dr. Eichhorn is going to tell us about this pig.

DR. EICHHORN: I have been requested to look at this hog with a view to its possibly being a case of swine erysipelas.

There is no indication whatever of erysipelas. We found that the cutaneous lesions were typical hemorrhages and on post-mortem examination we found a very interesting condition in this hog. It is rather unusual, I would say. If you examine the

lungs you will find there a multiple abscess formation with distinct pus formation. These lesions have probably existed for a considerable length of time. In addition to these abscess formations you will also note, at the apex of both lungs, an acute pneumonic condition, with gelatinous and even interstitial infiltrations, which indicates an acute condition of this part of the lung involvement.

You will notice the same acute condition on the heart, in the form of diffused hemorrhages, and also in some parts you may note petechial hemorrhages.

The acute infection is further demonstrated by the petechiae in the bladder, and also by the distinct circumscribed petechiae on the surface of the kidneys.

While this hog has evidently chronic infection in the lungs, which is manifested in the form of the multiple abscess formation, this condition, however, has no direct bearing whatsoever on the acute infection. Only inasmuch as the chronic lung lesions have probably devitalized the animal, it thereby becomes readily susceptible to the acute infection to which it might have been exposed. The acute lesions are very typical of hog cholera and I would consider that the death of the animal was due to such an infection. The multiple abscess formation has apparently no association with the cholera lesions and has probably existed for several weeks, before the acute disease of cholera developed.

DR. NEWSOM: What is the general thing to offer on the causation of that trouble?

DR. EICHHORN: The development of the multiple abscess in the lungs, and also in some of the lymph glands, was probably due to a pre-existing infection with some of the pyogenic organisms. They do not appear to be the result of hemorrhagic septicemia for the reason that the pneumonic conditions are not typical of the infection in the lung tissue caused by the hemorrhagic septicemia organisms.

DR. CAHILL: It seems to me that this is the best summary of the hog clinic this morning that one could possibly get. We have talked on necrotic enteritis and hemorrhagic septicemia, and in this pig we have all the lesions that have been described for either disease. If I am correctly informed on the history of this case, this is a pig that has been vaccinated. This trouble has followed as an acute infection, as a result of superimposing hog cholera virus on an already existing disease, and if that is true, we have in front of us now, a typical picture of the cases

which are responsible for so much grief among veterinarians—the post-vaccination trouble which is so common.

You have the lung there that is sufficiently chronic to indicate that it was not healthy at the time the virus was given. You have a chronic infection that has been there for weeks, and we have the acute infection that Dr. Eichhorn speaks of as superimposed on that. After my talk on necrotic enteritis somebody asked if I would advise that a pig affected with that condition be given a simultaneous treatment. If you do, this is just exactly what you get. The difficulty is to recognize these conditions which are present in swine, and which fail to show sufficient symptoms for the practitioner to recognize at the time he administers the hog cholera virus. I believe that this is the very condition which is responsible for ninety percent of the post-vaccination troubles.

QUESTION: What temperature would be used as a guide, whether or not to give simultaneous treatment?

DR. CAHILL: You could not go by temperature alone. In chronic enteritis you will catch lots of pigs that have very slight indications of diarrhea, without a marked elevation of temperature. It is easy enough to pick out these marked cases of chronic enteritis, but it is difficult to pick these cases where the animals are not showing symptoms, yet harbor chronic pulmonary or intestinal lesions, and should not be vaccinated.

DR. FERGUSON: For example, we have a bunch of hogs in practice that have that condition, or that are in the incipient stage of that condition. Wouldn't it be possible, by stirring them up right sharply, to get a decided coughing from the cases of that kind?

DR. CAHILL: You generally do. If you rush into the herd and vaccinate, and rush away again, this is what generally follows:

QUESTION: May I ask why, if you sometimes revaccinate with serum, that almost invariably you get good results?

DR. CAHILL: I think you are a little strong when you say invariably. You frequently do. You will frequently get good results if you give any immune serum, or even normal hog blood.

DR. SIMMS: If you give the serum and virus, almost invariably, in my experience, it stops right there.

QUESTION: How do you judge the age of the lesions?

DR. CAHILL: I don't think you can judge it.

DR. EICHHORN: If you examine the lungs closely, especially

the abscess and the surrounding tissues, you will find that it takes at least two weeks for the lesions to develop into a stage as seen in the specimen. It is, of course, difficult to judge accurately the age of lesions of this kind, nevertheless we can safely state that the lesions are older than one week, whereas the acute condition is of more recent development.

CHAIRMAN KINGMAN: We thank you for your interest, gentlemen. Remember we will begin again at one o'clock.

The meeting adjourned at eleven forty-five a. m.

ADJOURNMENT

LARGE ANIMAL CLINIC

THURSDAY AFTERNOON, AUGUST 31, 1922

The meeting convened at one o'clock, Dr. Kingman presiding.

CHAIRMAN KINGMAN: I am going to turn the meeting over to Dr. Merillat.

DR. MERILLAT: I think it was in 1890, at Atlantic City, that Dr. C. B. Michener brought a cow into the clinic of the Association for the first time. It was thought quite an innovation for the A. V. M. A. to have a cow clinic. I rather believe if it hadn't been for the respect the audience had for the doctor's ability, he would have been laughed out of the place.

The situation has so changed that the clinics of associations are now often as horseless as they were then cowless, but this is not as it should be. The horse is too important a creature to be eliminated from the affairs of man, and unless an awakening occurs, the disregard for the horse will revert very materially, against the progress of society. I think I have mentioned before that nations that ignore the horse have either perished from the earth or else have taken their place among the second-rate nations, while those that have made the best use of horses are today the powerful, strong nations of the earth.

Today the United States is in a transition period in this particular connection. Replacement of the horse by costly machinery might make us a third-rate nation, for the reason that no nation can spend more than it earns with impunity. In the case of individuals, the result is bankruptcy; in the case of nations, it means decadence and probably disintegration.

There is just a certain amount of wealth dug out of the earth every year; we mine our product from the earth, and if we waste more than we mine, and continue to do so, the result will be

decline. That is probably what is happening today; it is very likely that we are not mining out of the land of the United States as much wealth as we are wasting in motor vehicles. The billions of dollars that are made into beautiful vehicles and automotive tractors of different kinds, only to deteriorate and rust in a few years, is a waste that makes the waste of war seem insignificant; and unless we produce more cheaply, the wealth we now enjoy will be dissipated. So when I speak for the horse, I am not speaking for a species of brutes, but for society; because it is the cheapest, the most economical, the most sane motive power that ever has been maintained by man. In spite of inventive genius, there is yet to be found a motor power that will produce as much for the investment as the horse. So it is not only the veterinarian who is interested in promoting the welfare of the horse, but every man, woman, and child in the country.

The horse is a very old, domestic animal. Two hundred and fifty thousand years ago the horse was already undergoing domestication, and already played a very important role in the affairs of man during the days preceding the beginning of history. You all know what he has done for mankind since.

Our first case here is a lame horse which I wish Dr. DeVine would examine. This is a trotting-bred mare, six years old, with a record of about 2:20. She went lame last year during the racing season, and again broke down and was unable to finish this season.

The next case is a seven-year old mule with cataracts; one eye with pretty complete opacity and one just beginning to cloud up; probably there are some adhesions in the case of the left eye, and, of course, being a market mule, there is no history coming with it.

It is quite natural to diagnose a case of this kind as periodic ophthalmia, a disease that is very common in certain districts of this country. It is relatively rare in Europe. It doesn't exist very much west of the Rocky Mountains. There are regions in the middle West where the disease is very prevalent, and others where it is not known, but the toll it takes from the horse industry as a whole is enormous, there being some districts where horses cannot be raised profitably on account of the large number of three-, four- and five-year old horses that become blind before they can be put on the market.

There have been many investigations made as to the cause of this disease. It has been thought to be the result of bacterial

infection, but in spite of investigations, both in this country and in Europe, no causative bacterium has yet been found. Those who have studied the disease most, are beginning to believe that it is not a bacterial disease. I would like to have reports from the districts of this country where the disease is most prevalent.

Dr. Cameron, is periodic ophthalmia a common disease in the Northwest?

DR. A. E. CAMERON: In the Northwest there are very, very few cases. I don't remember having seen one, personally. In Eastern Canada and Ontario, I understand there are quite a few.

DR. S. E. HERSHEY (Charleston, W. Va.): We have a great deal of it through West Virginia, and especially the northern section, in the Patterson Creek Valley. We got some Percheron horses there, about twenty-five or thirty years ago, and since that time I am safe in saying that sixty-five percent of the draft horses raised in that section have periodic opthalmia. In the southern part of the state we have very little, possibly not more than ten percent.

DR. W. H. WELCH (Lexington, Ill.): We have lots of it in central Illinois. I couldn't say as to what percentage.

DR. MERILLAT: Is it a disease met with in practice constantly in Illinois?

DR. WELCH: Yes.

DR. MERILLAT: Is there any one here from west of the Rocky Mountains?

DR. E. E. WEGNER (Pullman, Wash.): The disease is not known in the state of Washington.

DR. MERILLAT: How about Chicago, Dr. Quitman?

DR. E. L. QUITMAN: We have lots of it, but it is sent to us from the country.

DR. MERILLAT: How about the horses that have been in Chicago a while?

DR. QUITMAN: It does not develop in horses that have been in Chicago over a year, and I would say ordinarily over six months; sometimes the onset of it seems to be delayed for perhaps six months, but even in that length of time it is rare.

I am a firm believer in the fact that all of our cases of periodic ophthalmia in Chicago,—and we have lots and lots of it,—are cases which have had a primary attack in the country, and the veterinarian in the country advised this client to send his horses to the city and cash in.

DR. MERILLAT: Not the Illinois veterinarian. (Laughter).

DR. QUITMAN: We feel assured that the disease is not transmissible from one animal to another, because we have many cases of a new horse showing it and intermingling with other horses, and it never affects any of the other horses that have been there over six months or a year.

DR. T. H. FERGUSON (Lake Geneva, Wis.): We have lots of periodic ophthalmia in Wisconsin, and it is usually seen quite extensively after outbreaks of influenza; it seems to be a sequel to influenza in young horses. Occasionally we have a case in an old horse; we get quite a few cases shipped to us from Chicago. (Laughter). The wise birds send down to Chicago to get some nice horses pretty cheap, and a good many times they draw a "moon-eyed" horse; they don't notice it until they get home. Maybe I notice it before they do, if they happen to bring them around. We get a good many cases.

DR. D. H. UDALL (Ithaca, N. Y.): We get plenty of it in New York. There is always plenty of it in Ohio. I am under the impression that there is much more in Ohio than there is with us.

DR. C. P. FITCH (St. Paul, Minn.): We have it in Minnesota. I don't think it is as common as it is in New York, but we do have it, and enough of it. I don't think it is as common as I saw it in the East.

DR. HAMLET MOORE (New Orleans, La.): We have quite a little of it in the South, but I was always under the impression, and am yet, that it is hereditary.

I practiced in Kentucky a short time and there was the Squirrel family of saddle horses. I know it ran through them to a great extent. There were several families of Squirrels there called the Red Squirrels. I don't remember the original sire, but after those saddle horses got to be four or five years old, there were a great many of them that developed periodic ophthalmia, and I was always under the impression that it was a strictly hereditary disease.

DR. MERILLAT: Has any one an opinion as to the cause of periodic ophthalmia? Has any research work been done in New York?

DR. UDALL: No.

DR. MERILLAT: Has anybody else any theory to advance as to the cause?

DR. A. G. STANFORD (Clay City, Ill.): I live a hundred miles

east of here and it seems as though it affects only the Clydesdale horses in that part of the country, and, in fact, they have almost quit raising the Clydesdale on account of that. Why is it that it affects them more than any others?

DR. WELCH: About five years ago, I think, Dr. Merillat and I had an argument over this on our way home from the Peoria convention. When we got through, he wound up by saying, "Welch, if I thought so, I wouldn't even say so in the presence of a veterinarian." At that time I made the statement that I believed that periodic ophthalmia was a sequel of influenza and distemper, that we saw it on special farms in the country where, through the early spring months, we had an outbreak of influenza and later a number of eyes would be lost on that place.

DR. QUITMAN: I would like to ask Dr. Welch to account for the fact that in Chicago we have thousands and thousands of cases of influenza, but as I said before, there are certain horses that do not become afflicted with periodic ophthalmia. Don't you think you have a local condition there that induces it, and influenza and distemper cases perhaps are left in a condition whereby they contract the disease more readily?

DR. WELCH: I think that the majority of influenza is much more severe among the younger growing animals, that the power of resistance of the more aged is stronger, and that is the reason you don't get so much of it in the cities. Your horses are aged and their vitality is better.

DR. QUITMAN: There would be some exceptions to the rule, but you never get it in a horse that has been in the city six months.

DR. WELCH: But where you have one case you have another following usually.

DR. QUITMAN: No, sir, we don't.

DR. MERILLAT: Dr. Bell wants to say a word.

DR. W. M. BELL (Nashville, Tenn.): We have lots of it in Tennessee, and it is not shipped in there from anywhere. The horses are raised there, and there is no breed that is exempt.

At the time the Bell-Meade Farm sold out, they had forty blind brood mares. We had a number of thoroughbred farms at that time and they all had quite a number of blind brood mares. Some of these brood mares were some of the best mares on the farm, and their colts brought the highest prices. Now we have also had it among the standard-breds; we had a number and have still a number of standard-bred farms that breed standard-bred horses and they have lots of it, and we also have it among

the mules; a great many mules have it that are raised in Tennessee. We also have it among the Percheron horses that are shipped in there and used there, and we also have it among the Shetland ponies. Now there is no breed that is exempt, and there is no breed in which it is more prevalent than any other breed, unless that breed is more prevalent than the other. It is raised there.

I practiced in Colorado for thirty years and they didn't have any of it there. When I located in Tennessee, I got some letters some time later, from Colorado, about standard-bred trotting horses, some about thoroughbred horses; they wanted a stallion and they didn't care if he was blind. They had used enough blind stallions in Colorado and they felt no fear whatever in using a stallion of that kind. For a horse to turn on the range, they wanted a horse that could see, but for the horses they kept up, they had no fear of periodic ophthalmia.

Now it looks to me like the climate has something to do with it. In that high, dry country where they have no malaria, there is no periodic ophthalmia, although they sometimes have influenza. Where we have lots of malaria, we have plenty of periodic ophthalmia.

In the city of Nashville, horses that have been working on the streets, in transfers, for a number of years, very seldom become victims. Our city is not as large as Chicago, but at the same time these horses get out at grass very little; they are kept up and worked steadily on the street and after they have worked a year on the street they very seldom develop this disease.

DR. MERILLAT: The probability is that breeding stallions that are taken into districts where this disease is prevalent get a very bad name, by reason of their colts becoming affected.

In Illinois we are studying the effect of the feed on the eyes of horses.

Dr. DeVine will now tell us what is the matter with this horse.

DR. DEVINE: As you sit there you see this horse is lame in both feet, but the history indicates that her left leg is giving her the most trouble. She has been lame about three months. There is a little periosititis near the carpus, almost involving the joint, and the tendon and sheath are involved. That evidently has not been very severe, because she has little lameness now. She is unbalanced now; she is standing crooked. If her feet are not given special care, it is a question whether or not she will ever amount to anything as a race mare. It would seem reason-

able to relieve the inflammation of that tendon, and then treat it as you like. The average man would fire it, but I would not fire it if it were my case. I would take the soreness out and reduce the tendon during the winter. Give special attention to her feet and get some of the acute inflammation out.

DR. MERILLAT: The next case is one of chronic laminitis.

I want to introduce Dr. G. A. Roberts, formerly of the United States, now of Brazil, who will demonstrate the new operation for this condition.

DR. G. A. ROBERTS: If I may borrow just a minute, gentlemen, I would like to boost Brazil. Any of you who anticipate a vacation trip this fall or winter, and care to go down below the equator, where the seasons are changed and where you have to look north to see the sun, you will find a most interesting view. At the present time an exceptional opportunity is offered because the dollar goes so far in that country. Their money happens to be very cheap and the dollar happens to be very high, so you can go a long ways in Brazil, at the present time, with exchange at the present rate. The city of Rio you will find to be one of the most beautiful ports in the world; many who have traveled say they have never seen a more beautiful port than that of Rio, and from there on back through the coffee country, in the state of Sao Paulo, where the world's coffee supply is grown, you will find many, many things to interest you, if any of you care to have such an experience. I would like, in introducing the subject, to make just a little alteration in the title. It is down on the program as "Operative Treatment for Laminitis." I would like to put it, "Dr. Stranaurd's Operation for Laminitis. Many of you have read Dr. Merillat's comment on this operation. I would like to say that I have two reasons for presenting this subject; one is because of the radical change of view as to the theory of laminitis, or founder, by Dr. Stranaurd, and the second reason is that Dr. Stranaurd and myself were colleagues for the past two years in Brazil.

Dr. Merillat made this comment, some time ago, on this treatment of Dr. Stranaurd: "His conception of laminitis is a great contradiction of all previous and well-established interrelations of all old and modern authorities. Laminitis, according to Stranaurd, is not an inflammation at all, and we believe he is right, for, after all, when we come to think of it, there is not a single feature of the local phenomena that simulates an inflammatory process except possibly the heat. The structural altera-

tions and terminations are not those of an inflammation of the cartilaginous membrane, as would be the case if the disease process were in reality a laminitis."

Dr. Stranaurd is a Belgian veterinarian, and was in the Belgian Army during the war; he had the opportunity of working a great deal with what we are inclined to call laminitis, or what he prefers to call founder, not calling it an inflammation, although I am not so certain that he wouldn't say there might be some inflammatory conditions present. But the inflammatory condition, if present, is a very limited factor. The greater factor is that of an upsetting of the vasculo-motor apparatus, in which, because of this, the vessels become dilated to the extent that circulation is impeded in the foot and to that extent then changes take place very rapidly, such as to bring about the conditions that we observe in laminitis.

Dr. Merillat, in his article, treats more or less on the acute form of laminitis or founder, and what I have to say is not with reference to the acute form, because in the acute form Dr. Stranaurd likewise uses the same method as we do to a large extent. On the other hand, he does stress very strongly the moving of the animal in order to prevent this condition in the first place, or in the very early stages of founder, to keep the animal moving, so as to assist in the circulation of the blood through the foot before these permanent conditions take place.

Dr. Stranaurd likewise had some most interesting specimens of pedal bones, in which he was able to indicate very materially the absorption process of the disease, due to the impeded circulation in the foot. In long continuous cases of laminitis, he showed where there had been an absorption of nearly half of the anterior part of the pedal bone, due to the absorption process.

To get down to the point of his operation, I would like to say that we are unable to operate here because of inadequate instruments, so we attempted to get a foot and do the best we could on what we have here, in order to show the method of his operation for those cases that do not respond to the ordinary lines of treatment in the beginning, such as that of the keeping of the animal in motion, that of the foot bath, that of the use of depressants, either of local blood-letting, to a certain extent, or of the use of the medicinal depressants, such as aconite, but in those cases that fail to respond in something like three weeks, and there is no sign of improvement, he does recommend his operation as most efficient, and in a very large number of cases, if taken

before too much structural change has taken place, a complete recovery has resulted. Even in very chronic cases he advocates it as the most successful and the most useful of any treatment that can be done for the animal, and he says you will be surprised, in a great many instances, at the benefit that will be derived, even in those very old chronic cases.

His theory is that the trouble is due to a disturbance of the circulation in the foot, resulting in a permanent dilatation of the blood-vessels. His treatment is the removal of those blood-vessels and letting nature reproduce a new set of blood-vessels in the part. For that reason, then, he operates on the horse standing up; he first takes one foot and uses local anesthetics, because in this case the animal is often in so much pain that it doesn't care to stand, and, therefore, in order for the animal to stand on one foot while he is starting his operation on the other, he cocainizes the foot that he wants the animal to stand on, then he lifts the other foot up and begins his operation, which is, to a large extent, a horse-shoer's job, so to speak, in that he trims down the wall of the heel, and of the side of the frog, with the rasp, so as to get complete relief of any pressure over the region of the heel and of the inside of the frog. Before getting to the sensitive structures here, he releases that foot and cocainizes it. Then after the effect of the cocain has taken place, he starts on the opposite foot and goes through the complete operation on the other foot, on both sides. I have taken only one side here in order to have one side for comparison. Unfortunately, with the instruments we had at hand, we were unable to do as neat a job as we would like to have done.

After exposing the sensitive structures of the latter part of the wall and the heel and the sensitive part of the frog he exposes the blood-vessels along the coronet, and of the postero-lateral part of the frog. After that, in order to remove all blood-vessels supplying blood to that region, he goes right over the exposed parts with a curet, completely destroying all blood-vessels present, carrying the curet around behind and down to the lateral surface of the sensitive frog. The foot is then bandaged up and the animal is allowed to have the freedom of a box stall for a few days, and he says in a week or ten days he is able to put the animal to light work. He says that the results from this operation are well worth the attempt to get results when everything else fails. He says he does receive favorable results in a large percent of the chronic cases where you wouldn't expect results to be obtained.

I have attempted to give only his views as to the theory of it and as to the method he uses in operation. Now there are other possible improvements that can be made; he doesn't pretend to have the operation perfected, and yet those are the principles with which he believes success can be obtained in treating these semi-chronic and chronic cases of laminitis.

Dr. Merillat called my attention to overlooking some of the other ideas of Dr. Stranaurd. He illustrates by a chart, showing that where there is a principal channel of blood supply coming down to the foot, passing down through this central channel, there is a more rapid rate than normally and the lateral vessels failed to get their due supply of blood in them, with the result, then, that there is a very unequal distribution of the blood in the different vessels that go to the foot, because of the main supply getting such an excessive current of blood through it to the point that it finally breaks down, losing its vascular nervous control and resulting in a permanent dilatation and a somewhat limited supply of blood going through the other vessels.

Dr. Merillat: The thing we ought to remember about laminitis is that the old notion of keeping horses quiet is wrong, and that there is a treatment available for subacute and chronic cases. So far, in this country, we haven't operated on enough chronic laminitis cases to confirm what our Belgian colleague has said. Horses have been rather cheap and there isn't very much inclination on the part of the owners to keep them through the period of convalescence, but let us remember there is a classical surgical operation for chronic laminitis that has value.

Chairman Kingman: I want to get straight on this laminitis. Does Dr. Roberts admit that there is such a thing as rotation of the pedal bone upon the transverse axis in its relation to the hoof?

Dr. Roberts: I am not convinced of it myself, Doctor, although I am willing to be; I am from Missouri, originally.

I asked that question of Dr. Stranaurd. He doesn't say it is always a rotation, but he says the only cases in which he has not received benefit from this operation are when there is a sufficient deflection of the bones remaining there for such a length of time that they have become fixed.

Chairman Kingman: I am maintaining that there is actually a rotation of the os pedis in its relation to the bones of the leg, but that apparent rotation with relation to the hoof is perhaps a misnomer, and is due to the slipping of the hoof upon the os

pedis rather than a rotation. The point I wish to bring out, if that is true, is what is it that permits this rotation of the hoof, then, upon the os pedis, or the rotation of the os pedis, just as you choose to call it?

DR. ROBERTS: There is often a very perceptible excess of serous fluid in the foot that allows considerable rotation to take place. In this connection it may be greater at one point than at another point, and therefore, you get a rotation at one point that wouldn't be given at another.

DR. MERILLAT: We plan to use the next subject to demonstrate dental nerve-blocking. The procedure consists of the injection of an anesthetic solution in the dental canals. By inserting a needle through the infraorbital foramen, a large volume of fluid is driven back into the canal.

Dr. Bemis, you will remember, performed nerve-blocking by delivering the fluid on the nerves of the posterior end of the dental canal, and was particularly successful, insofar as the upper jaw is concerned, the objective being to deliver fluid at the maxillary hiatus with a needle five inches long.

DR. BEMIS: I will just take a moment to recall the anatomy, so you will realize it fully, if you have not recently looked over a horse's skull, or tried this injection.

Of course, you realize that immediately below this region is the large temporal fossa, and if you remember from your anatomy, the nerves pass across the floor of this fossa, coming from the cranial cavity and the supermaxillary nerve, which gives off the branches of the superior dental nerve, and finally supplies all of the superior cheek teeth in that particular arcade and goes down to the depth of the maxillary hiatus.

Now, by merely observing on the skull where a needle should pass in order to reach that nerve, we developed this method to reach the dental nerve. The maxilla is curved slightly backward posteriorly. In passing a needle, if it is found to come in contact with a bone, after it has passed to a depth of possibly an inch or two inches, one will know that the needle is slightly too far anteriorly. Then all that is necessary to do is to withdraw the needle part way back through the skin, but not from the skin, and redirect it slightly backward. Attempt to follow as closely as possible the outline of the maxilla in the depth of the fossa, because it is at the very anterior part of the fossa that we wish to make the delivery. Then, passing the needle again, it will be found to penetrate to a depth of possibly three or four inches,

depending upon the size of the animal. At that point a reaction on the part of the animal will sometimes be noticed on account of hitting the nerve directly. We then inject about four cubic centimeters of a two-and-one-half percent solution of a local anesthetic, either cocain or novocain, or any of those drugs which are giving good results. In my own work I discontinued the use of cocain altogether, because I think there are other drugs which are less toxic and give just as good results.

Now for the interior dental nerve the results are not quite so satisfactory, because the inferior dental nerve is much harder to reach.

DR. FERGUSON: How long a needle do you have to use?

DR. BEMIS: About a five-inch needle.

DR. MERILLAT: I have used Dr. Bemis' method from the very day we heard of it, and have had very splendid success. I believe the reason that it has not been used as a routine measure is because it was thought difficult and dangerous, which is not the case.

DR. WEGNER: How much fluid do you use?

DR. MERILLAT: Generally about four to eight cubic centimeters.

Now I want to draw your attention to a system of throwing horses.

DR. QUITMAN: Demonstrate how you lift a horse up.

DR. MERILLAT: That is done by centering the rope around the neck, cross it in between the front legs and again cross it over the back, then between the hind legs and up the middle of the back under the crossed ropes and tie to the front rope passing around the neck.

DR. CLARK: I have another way. I take four automobile casings and put one over each leg, and bring the two front ones together and the two back ones together at the top, then fasten a single-tree to them and pull him up. The single-tree runs lengthwise across the back.

DR. MERILLAT: I didn't make any attempt to demonstrate this simple method of casting horses in our other operation of nerve-blocking. We just wanted to show this pony that we would block his cheek teeth if we wanted to.

I have been requested by a number of veterinarians here to demonstrate this simple single-rope method of casting horses. I had used other methods for many years, until about five years ago, when the veterinarians in Saskatchewan showed me this

method, and since that time I have never thought of any other way. It is perfect in regard to securing horses so that they will not hurt themselves. It is a method of restraint that actually immobilizes the body, and all I request of prospective critics is to suspend judgment until they have tried it several times. The method looks simple and it seems to be nothing new. But it is quite new in many respect if every part of the system is carried out according to certain prescribed directions.

The rope must be one-half inch in diameter. If you think of using a rope larger or smaller, then don't try this method. Any kind of a cheap rope will do, but its dimension must be one-half inch. About sixty-five feet is required for an ordinary horse. If a large, ton horse is to be handled, it is necessary to use seventy-five feet. This rope is over eighty feet long. It is advisable for a country practitioner to use two forty-foot lengths. One forty-foot length is long enough to cast any kind of a small animal, whereas if a large animal is to be cast, then the two are used together.

Any kind of a bowline knot will do. Another thing I would make clear is that, if you don't use such a knot, then don't use the rope or contemplate its use, because a common knot will tighten and be almost impossible to untie.

(Method of casting was demonstrated)

QUESTION: Wouldn't you prefer a cotton rope?

DR. MERILLAT: Yes, I believe white, cotton ropes are a little better, in fact, preferable to these if double half-hitches on the leg are not used, as it is difficult to loosen them. A double half-hitch, once tightened on a leg, sometimes makes a knot that can't possibly be opened; otherwise, a cotton rope is very good, if the half-inch size is used.

DR. BELL: We use a method similar to this. We tie a foot up, pull his head to the side, and he lies down.

DR. MERILLAT: I don't object to that, but I am quite sure if you will just stick to this simple system, you will seldom have an accident.

If you operate on the inguinal region, the knot on the back is set a little further back. The knot on the back is set almost at the croup.

CHAIRMAN KINGMAN: Is Dr. Reed here? Dr Reed has an announcement to make.

DR. REED: Owing to the fact that Prof. H. R. Smith cannot be here tomorrow morning, it has been decided that it would be

best to allow him to read his paper on "Tuberculosis in its Relation to the Feeding and Marketing of Live Stock," this afternoon. It fits in particularly well with the demonstration that will be given in a very few minutes after Prof. Smith has read his paper. I will ask Prof. Smith to read his paper at this time.

(Prof. Smith read his paper, which was published in the JOURNAL, January, 1923).

ADJOURNMENT

(To be concluded)

We Want 5000 Members This Year.

COLORADO ENDURANCE RIDE—1923

The 1923 Colorado Endurance Ride will take place at Colorado Springs, Colo., July 29-August 4. These Endurance Rides are approved by the War Department, the Chief of the Remount Service, the Chief of the Bureau of Animal Industry of the Department of Agriculture and the Sponsors. The latter include several private individuals interested in good horses, the American Remount Association, the Arabian Horse Club of America, the Genesee Valley Breeders' Association, of Avon, N. Y., the Horse Association of America and the Morgan Horse Club.

The Endurance Rides are designed to stimulate general interest in the breeding and use of good saddle horses of a general utility type, possessed of stamina and hardiness and at the same time having the necessary quality to render them suitable for use in the mounted service of the United States. In particular, it is desired:

(a) To demonstrate the value of type, soundness, and proper breeding in the selection of horses for long and arduous work under the saddle.

(b) To ascertain and to demonstrate the proper method of training and conditioning horses for long and severe work under the saddle.

(c) To encourage horsemanship in long distance rides.

(d) To ascertain and to demonstrate the best methods of caring for horses during and after long, severe work, without artificial aids or stimulants.

Drs. M. J. Dunleavy and A. J. Savage, of Colorado Springs, Colo., are the official veterinarians.

OTHER MEETINGS

NORTH CENTRAL IOWA VETERINARY MEDICAL ASSOCIATION

The regular spring meeting of the North Central Iowa Veterinary Medical Association was held at Fort Dodge, Iowa, May 28, 1923. Previous spring meetings have not usually been so well attended as was the case this year. The splendid program, however, called out practically the entire membership.

The retiring President, Dr. J. H. Lynch, Fonda, Iowa, in an address on some of the matters of interest to the profession, called attention to the work done by the Association during the past year.

Dr. C. P. Fitch, of the University of Minnesota, gave a splendid lecture on Abortion Disease in which he made a resumé of the recent research work done on this disease and offered many practical suggestions for controlling bovine abortion.

We were also fortunate in having on the program Dr. H. Preston Hoskins, of Detroit, Michigan, Editor of the Journal and Secretary of the A. V. M. A., who told something of the work of the new position of Secretary-Editor and showed by his statements that it is essential that every veterinarian eligible to do so should join the National Association and read the Journal. Dr. Hoskins made it plain that there is a place in the Association for every veterinarian throughout the country and his visit to this part of the State will do much good, as it has brought nearer to the profession the desires and aims of the National Association.

The addresses above referred to were followed by an interesting paper on Hemorrhagic Septicemia, by Dr. W. P. Bossenberger, of Williams, Iowa, and a most instructive paper by Dr. F. H. Kelley, of Goldfield, Iowa, on the handling of riding and driving horses. Dr. Kelley's paper was timely and brought out some new and practical ideas for veterinarians to consider.

The following officers were elected for the ensuing year:—President, Dr. C. W. Anderson, of Jewell, Iowa; Vice-President, Dr. E. R. Truax, of Sac City, Iowa; Secretary-Treasurer, Dr. H. J. Shore, of Fort Dodge, Iowa. Dr. W. F. Miller, of Storm Lake, Iowa, and Dr. C. E. Juhl, of Osage, Iowa, were elected to fill vacancies on the Executive Board.

In the evening the members, their wives and friends were entertained by the Fort Dodge Serum Company at a dinner and dance.

H. J. SHORE, *Secretary.*

We Want 5000 Members This Year.

B. A. I. VETERINARY INSPECTORS' ASSOCIATION OF CHICAGO

The following is a report of the meetings held during the last month by the school of instructions for veterinary inspectors, which meets in the Government office of one of the local plants each Monday morning. The Chicago Branch of the National Association of Bureau of Animal Industry Veterinarians prepares a program for several weeks in advance on various subjects relating to meat inspection. Pathological specimens of interest, as well as rare conditions found by the inspectors are collected during the week and presented to the meetings for diagnosis and discussions.

May 14, 1923. The third talk on the "Lymphatic System and Its Importance to Post-Mortem Inspection" was given by Dr. L. T. Hopkins, and illustrated on large charts showing the afferent and efferent vessles.

May 21, 1923. The collection of pathological specimens was so large on this date that no regular paper was presented.

May 28, 1923. Dr. L. E. Day, who has just recently returned from Central America, where he had spent a few weeks looking for foot-and-mouth disease, was the speaker of the morning and he gave a very interesting report of his trip.

June 4, 1923. Dr. J. Hannon read a paper on Alcohol.

L. T. HOPKINS, *Secretary*

Plan To Go To Montreal, August 27-31.

ARKANSAS VETERINARY ASSOCIATION

The annual meeting of the Arkansas Veterinary Association convened at the Marion Hotel, Little Rock, Ark., June 9, 1923. President Kittrell, of Augusta, presided.

A short business session was held, the minutes of the previous meeting being read and approved, as well as the financial state-

ment of the Secretary-Treasurer. An election of officers resulted as follows: President, Dr. I. Peters, of Fordyce; Vice-President, Dr. O. D. Campbell, of Warren; Secretary-Treasurer, Dr. J. H. Bux, of Little Rock. The date for the 1924 annual meeting was set for the third Saturday in June.

The first paper on the program was by Dr. I. Peters, entitled, "Paraplegia and Other Kindred Conditions of Cattle." The author described several disorders met in cattle, that had somewhat puzzled him. These were of a paralytic nature, occurring both before and after parturition. Large doses of nux vomica and laxatives seemed to give best results, but this treatment was not always satisfactory. There were no abortions with these attacks. Inflation of the udder seemed to be helpful, although Dr. Peters was of the opinion that the trouble was not milk fever. Various suggestions were made, as to possible causes, including lack of the proper mineral requirements and cottonseed poisoning, but these seemed to have been eliminated as causes.

Dr. H. W. Wilson, of Helena, gave a chalk-talk on "Types of Special Shoes for Pathological Conditions and Faulty Conformation." He proved himself to be an expert, both as an artist and as a foot-surgeon. Dr. Wilson has given a great deal of time to the study and treatment of lameness, and he amply demonstrated his willingness to pass along the results of his practice and observation to his fellow-practitioners.

Dr. H. Preston Hoskins, Secretary-Editor of the American Veterinary Medical Association, brought a message from the national organization. He related the history of the efforts which had been put forth to secure a full-time officer, who could devote all of his time to the work of the Association and the welfare of its members. He told of some of the things which the Association hopes to be able to do in the near future. Dr. Hoskins spoke of the need and advantage of a large national organization, and explained that a larger field of usefulness could come about only through a larger membership. He explained the functions of the official Journal, and asked all practitioners to feel that they had an obligation to the Journal, and that they should hold up their end with the laboratory men, the Bureau men, and the various other branches of the profession.

Dr. O. M. Norton, of Greenville, Miss., presented the subject of "Black Tongue in Dogs." He described this disease, which has given Southern veterinarians so much trouble, and then outlined the plan under which a new treatment for the disease is

being used, with apparent success by many veterinarians in the Southern States.

Dr. Hubert Shull, of Texarkana, spoke on "Canine Practice." He explained the methods by which he had been able to build up a very lucrative, small-animal practice in his city. Many of his suggestions could be carried out by any veterinarian who desires to cater to this class of work, and thereby keep clients from going to the drug-store to purchase proprietary dog remedies.

After luncheon the members were driven out in the country, to one of the State farms, where a clinic had been arranged. Dr. L. B. Ernest, Bureau of Animal Industry, Washington, D. C., gave a practical demonstration of the technique to be employed in the intradermic and ophthalmic tuberculin tests. He also explained many of the B. A. I. regulations in relation to tuberculin testing and interstate shipments.

Dr. S. J. Shilling, Associate Veterinarian, Agricultural Experiment Station, Fayetteville, demonstrated methods of examining the female genitalia for the treatment of sterility and other sequelae of infectious abortion. He used pathological specimens and live animals in his demonstrations.

J. H. Bux, *Secretary-Treasurer.*

Have You Secured One New Member This Year?

COLORADO VETERINARY MEDICAL ASSOCIATION

A very successful three-day session, constituting the semi-annual meeting of the Colorado Veterinary Medical Association, was held at the Colorado Agricultural College, at Fort Collins, Thursday, Friday and Saturday, May 31st, June 1st and 2nd, 1923.

New members were elected as follows: Drs. Paul E. Taussig, William Earl Williams, E. S. Thomas, Albert B. Eschanbacher and Ronald M. Gow.

Under the heading of "Bulbar Paralysis in Cattle," Dr. George H. Glover discussed the paralytic conditions which we find in these animals and which are frequently discussed under the name of forage poisoning.

The subject of "Urinary Calculi in Sheep" was discussed by Dr. Harry P. Scott, of Brush, in which he detailed an outbreak of this condition in a band of lambs on feed. There was a loss of something like 50 head out of 4000. Nothing very definite could

be shown as to the causative factor but suspicion pointed to a rather heavy feeding of linseed meal. All lambs affected were males and all died as a result of rupture of the bladder.

Dr. H. F. Lienhardt, Pathologist of the Kansas State Agricultural College, was a special guest of the Association and presented papers on "Posterior Paralysis in Pigs" and "Losses in Cattle on Stalk Fields." Dr. Lienhardt illustrated his lecture on the pig trouble with slides detailing experiments which he had carried out which seemed to prove conclusively that the trouble was due to a deficiency in the diet and could be rather easily controlled by proper rationing. In his talk on corn stalk disease he pointed out that there is a malady which is entirely distinct from hemorrhagic septicemia, anthrax and potassium nitrate poisoning. He had not, of course, determined the exact cause, but for the sake of further research suggested the possibilities of an anaphylactic disturbance.

Coccidiosis in calves was treated by Dr. A. G. Wadleigh, of Monte Vista, who reported some outbreaks which had occurred in his practice. A number of interesting case reports were made by Drs. W. G. Blake, F. R. Smythe, F. F. Mendenhall, D. C. Patterson, James Farquharson and Geo. W. Dickey. The latter presented four goats which showed all the paralytic symptoms commonly associated with a lack of vitamins or a mineral deficiency. In discussing the case, however, he stated that the goats were sucking their mothers and that their mothers were on a varied diet of alfalfa, corn and oats, with frequent additions of other feeds. The goats had been in the hospital for 4 days previous to the meeting and had been given cod liver oil, cow's milk and lime in addition to alfalfa and bran, but without showing any particular improvement.

Cervicitis was ably presented by Dr. H. E. Kingman, who used a great deal of packing house material for illustrating the subject.

The subject of "Tuberculosis" was handled by Dr. W. E. Howe, Chief of the Federal Quarantine work at Denver, who presented a paper showing some of the vagaries associated with cleaning up the herds of the country. He detailed many cases illustrating the points which he brought out. A demonstration of tuberculin testing, especially by the intradermal method, was presented by Drs. Stout, Dallas, McCapes and Dickey. Finally, an animal which had reacted to the intradermal test was slaughtered, the only lesion present occurring on the skin, near the knee, in the form of a nodule as large as a duck egg. It had been

expected that the cow would show a generalized case of tuberculosis, since, in spite of heavy feeding, she was quite thin. The autopsy, however, developed two badly ulcerated molar teeth, which were undoubtedly responsible for the general physical condition.

The provisions of the new tuberculin test law were discussed by Dr. Chas. G. Lamb, State Veterinarian.

The common poultry diseases were discussed by Dr. I. E. Newsom, who pointed out the reasons for the heavy losses in incubator chicks.

The Association varied the usual program on June 1st, in order to take advantage of the annual Cattle Feeders' Day, here at the College. This day was arranged for the purpose of inspecting the experiment steers which had been on feed for some months previously and were ready for market. The program was in charge of Prof. E. G. Maynard, who exhibited the steers and discussed the results of the experiment. Those presenting talks were Dan D. Casement, of Manhattan, Kansas, on "Feeding Cattle for Profit" and Edward N. Wentworth, of Chicago, on the "Relation of Consumptive Demand to Cattle Type." This combined meeting of the two groups seemed to be for the best interests of both, although the feeders far outnumbered veterinarians present.

By way of entertainment, on the first evening of the meeting a picnic dinner was enjoyed some miles west of Fort Collins. On the evening of June 1st the usual annual banquet and ball were held. On the afternoon of June 1st the program was set aside long enough to witness a very exciting baseball game between the University of Colorado and the Colorado Aggies, in which the latter won by a score of 6 to 4.

I. E. Newsom, *Secretary.*

Does Your Wife Know About The Women's Auxiliary?

THE VETERINARY ASSOCIATION OF NEW SOUTH WALES

The May meeting of the Veterinary Association of New South Wales was held at the Veterinary School, University of Sydney, on Tuesday, May 8th, 1923. There was a good attendance of veterinarians who listened with much interest to an illustrated address on "Recent Researches on Vitamins," by Associate Pro-

fessor Priestly, M. D., Ch. M., B. Sc. He covered progressive steps of recent researches and the audience was much alive to those researches carried out on animals and applicable to domestic stock.

Mr. Le Souef, G. M., V. S., Director of the Zoo, referred to the need for research along the lines outlined by the lecturer on the feeding of cage birds on seeds. Mr. Henry, M. R. C. V. S., Senior Government Veterinary Surgeon, was anxious that some research should be done on the relative vitamin content of our suburban and country milk, especially with regard to the changes in fodder at different seasons of the year.

Mr. Clunies Ross, B. V. Sc. (Walter and Eliza Hall Fellow), discussed the feeding of pet dogs and their habit of eating grasses when opportunity occurred. Mr. Hindmarsh, B. V. Sc., discussed the feeding of white and yellow maize, separately and in the absence of vitamin-containing food to pigs and the favorable results when the latter maize was used. This brought forward the relationship of the pigment carotin to vitamins.

Dr. Dodd, Veterinary Bacteriologist, proposed a hearty vote of thanks to the lecturers and laid stress on the advisability of not accepting, without experiment, the results of research in Europe and America, as being applicable to Australian conditions; also of results of experiments on animals such as rats, fed on foods usually consumed by humans, as being applicable to domestic stock fed on natural fodders. Dr. Seddon, Government Veterinary Bacteriologist, seconded the motion which was warmly supported by the chairman, Professor J. D. Stewart and confirmed by acclamation.

FRANK WHITEHOUSE, *Hon. Sec.*

We Want 5000 Members This Year.

THE MAHONING VALLEY VETERINARY CLUB

The Mahoning Valley Veterinary Club held its first meeting at the farm of Dr. W. Timblin, near Punxsutawney, Pa. Clarion, Elk, Jefferson, McKean, Indiana and Clearfield Counties were represented. Credit must be given to Dr. F. A. Marshall, of Indiana, Pa., for the organization of this club, which makes the thirteenth Veterinary Club in the State of Pennsylvania.

Dr. George A. Dick, of the University of Pennsylvania,

addressed the members on feeding in general and the importance of vitamins in particular.

The next meeting will be held at Brookville, Pa., on September 13, 1923.

C. M. CHRISTY, *Secretary*.

Plan To Go To Montreal, August 27-31.

The Pennsylvania Bureau of Animal Industry accomplished a very important piece of work recently when 40,000 cattle were tuberculin-tested in Mercer County, Pa. The county was made a tuberculosis-free area. The work was accomplished in two weeks. Of the animals tested, about 2% reacted.

An outbreak of malignant catarrhal fever recently occurred in Pennsylvania, but is now under control, through the efforts of the Bureau of Animal Industry of that State.

A moving picture film is being shown all over the country, taken in the operating room of the School of Veterinary Medicine, University of Pennsylvania. It shows Dr. John W. Adams performing an operation on an equine patient, secured on the table designed by the operator.

A SOUND HORSE

Little boy when asked to use the words "horse" and "cornet" in the same sentence made the following reply: "We give our horse corn at noon, and by night he has his cornet."—*Chaparral.*

EXPENSIVE

A Gothamite in Havana asked central to connect him with a certain number in New York, adding, "Tell the party who answers that I wish to speak to my bulldog."

After a brief interval, guests standing nearby heard a faint "Woof, woof!" coming from the receiver. Then central cut in sweetly, "Your time is up; that will be twenty dollars."

"Dog-gone!" growled the New Yorker, "that's ten dollars a woof."—*Boston Transcript.*

COMMUNICATIONS

THE THERAPEUTIC VALUE OF YEAST

To the Editor:

I have noted the advertisement of Fleischmann's dry yeast in the May number of the Journal, especially the claims which place this product in the same class with many other over-advertised and under-proven agents which are usually advanced as "cure-alls." I would like to call attention to the report on Fleischmann's yeast which was recently made by the Council on Pharmacy and Chemistry of the American Medical Association. This report appears on page 1398 of the May 12th issue of the *Journal of the A. M. A.* I would like to direct your attention to the following portion of this report:

"In March, 1921, the Council took up the consideration of Fleischmann's Yeast on account of the extensive and extreme therapeutic claims which were made for this preparation. Since then the Council has given much attention to the subject of yeast therapy. The chairman called in consultaiton eminent students of nutrition and clinicians qualified to speak with authority on questions of nutrition, dietotherapy and pediatrics. The object was to determine whether the effects of yeast and yeast preparations on animals deprived of food containing vitamin B gave promise of having important therapeutic application. After a comprehensive discussion it was concluded that there is little likelihood that the administration of yeast or yeast preparations representing vitamin B concentrates will be of therapeutic value in many cases for which they are advertised. The view that there was no satisfactory evidence in favor of the therapeutic administration of yeast in most conditions for which it is advertised was concurred in by many of those who have contributed to the laboratory reports of the action of yeast or its vitamin in experiments on animals previously deprived of the growth-promoting constituents present in many foods and in yeast.

"As a result of its inquiry, the Council adopted (The Journal, April 15, 1922, p. 1146) the following principles to guide in the consideration of yeast preparations and vitamin B concentrates:

1. The claim that deficiency of vitamin B and diseases resulting therefrom are common conditions in the United States is not at this time supported by adequate, acceptable evidence.
2. The claim that yeast preparations or extracts are, in principle or in general, essentially more effective or more practical or more available means of administering vitamins than the commonly available vitamin-containing foods is not at this time supported by adequate, acceptable evidence.
3. The claim that therapy with yeast or yeast preparations has as yet more than an experimental status is not at this time supported by adequate, acceptable evidence.

"Further, the Council has adopted (The Journal, July 8, 1922, p. 135) an article on yeast preparations for inclusion in New and Nonofficial Remedies in which, among other things, it is pointed out (1) that the opportunities to obtain vitamin B through the customary foods are so abundant as to make the demand from special sources of the vitamin limited at the present time; (2) that yeast is a mild laxative, but that the cause of this laxative action has not been determined so far as one can learn; (3) that the supposed beneficial effect of yeast administration on furuncles, acne, etc., lacks substantiating evidence; (4) that such laxative effects may be expected from an anticonstipation agent; (5) that it is not clear whether live cultures of yeast may be used to change the intestinal flora, if indeed such reaction becomes desirable, and (6) that many of the conditions for which yeast and yeast preparations

have been proposed are so variable in their clinical courses and so likely to show improvement without special treatment that the elaborate claims that are made for yeast therapy for somewhat indefinite disorders must be largely discounted."

The statements contained in the advertisements are too misleading and fanciful to go entirely unchallenged, and the important points of the above report can be applied to animal health as well as the public health. I do not believe that many veterinarians will be misled into a wholesale prescription of dry yeast or like products for their patients, but it is certain that plenty of livestock and poultry raisers will spend good money on it.

As veterinarians, we can point out to such people that the essential property of yeast (vitamin B) occurs in abundance in many common animal and poultry feeds, and that they need have no concern about their stock developing a general need for yeast, either wet or dry. As for the laxative effect of yeast, the report points out that such effect can be obtained by anti-constipation agents of known action. There may be rare instances in veterinary practice where the administration of yeast might be of value, but such instances would not justify the general acceptance of the product as the panacea for all ills.

One possible source of profit has been overlooked apparently, by certain sales and advertising managers: No advertisement has appeared setting forth the necessity of feeding raisins, sauerkraut, etc., to livestock in order to furnish the daily ration of iron, certain varieties of bacteria, and what-not. The human family already faces such necessity, if one is to judge from the blatant advice which is becoming increasingly common in the advertising sections of our periodicals. It is my personal opinion that, when the diet of the human and animal population becomes so refined and concentrated as to require the daily consumption of raisins, yeast, sauerkraut and like products in order to keep well or get well, then the entire race of human and animal beings will be too far lacking in vitality to be revived by such picayune measures. As stated in the report, the Council on Pharmacy and Chemistry voted to refuse recognition to Fleischmann's yeast, (1) because it is advertised by means of unwarranted and misleading therapeutic claims, and (2) becuase it is advertised to the public with unwarranted therapeutic claims that might become a detriment to the public health. Therefore, I fail to see why our profession should be asked to accept a similar product for veterinary therapeutics.

J. G. HARDENBERGH.

Rochester, Minn., May 21, 1923.

PROPOSED CHANGES OF THE CONSTITUTION AND BY-LAWS

To the Editor:

I wish to concur in the views expressed by Dr. Mayo in the May number of the Journal, page 265, regarding the proposed changes in the Constitution and By-laws. Our present Constitution and By-laws were adopted at Detroit in 1916. Considerable valuable time was given to the consideration of this document. It has been in operation for the past seven years, during which time the profession has been greatly disturbed by the World War and general business depression. There are evidently a few minor changes that could be made with benefit to the organization. Is it necessary or advisable at the present time to consider the extensive and sweeping changes submitted on page 780 of the March number of the Journal of this year? If so, why?

Those of us who were not present at the recent meetings of the Executive Board and Revision Committee have not been informed of the defects in the present Constitution and By-laws or the needs of the sweeping changes proposed. It would appear to one on the outside that for some unknown and mysterious reason the association was persuaded to authorize the appointment of a committee to provide for a closer affiliation between the A. V. M. A. and local, state, and provincial associations. Considerable attention was given this subject during the preparation of the present Constitution and By-laws.

It has been nearly a year since the Revision Committee was appointed and less than three months since their proposition to change the By-laws was published. It would appear that the plan published in the March issue of the Journal is a substitute for the proposition presented at the St. Louis meeting. Are we now to expect that one of the main attractions on the program at Montreal will be a lengthy presentation and discussion of a proposition to change the Constitution and By-laws which has has not been proposed in accordance with Article VI of the present Constitution?

The offices of Secretary and Editor of the Journal have recently been combined and a full-time man appointed. Would it not appear more desirable to give this plan a fair trial and help the new Secretary-Editor develop the present organization, than to begin at once to clutter up the machinery by a lot of new and untried legislation?

C. J. Marshall.

Philadelphia, Pa., May 28, 1923.

IN REBUTTAL

To the Editor:

"Quem Jupiter vult perdere, dementat prius." I have read with much satisfaction the scurrilous outburst of the Sage of Goshen in the May number of the Journal. I hope that it will be carefully read by every member and especially by the Executive Board of the A. M. V. A. My article in the March number succeeded beyond my fondest hopes in causing the Sage to expose so fully to his colleagues the sort of man he is. Usually men of that type are pachyderms, and it is no small accomplishment to "get under their skins" without descending to their mental and ethical level.

The Sage falls into the common error of regarding all criticism as destructive and personally unfriendly. If he will consult any good dictionary he will discover his mistake. It is quite true that there was, and was intended to be, a good deal of unfavorable criticism in my article. A radical operation on a case of cancer is frequently destructive to a marked degree. The only real enemies with which our profession has to contend are internal; they are charlatinism and ignorance, which are so often embodied in the same individual.

Septimus Sisson.

Columbus, Ohio, May 21, 1923.

Does Your Wife Know About The Women's Auxiliary?

VETERINARY CORRESPONDENCE COLLEGE

To the Editor:

Concerning the matter of the Veterinary Correspondence College, referred to editorially in the May Journal, allow me to state that in Great Britain and Ireland they have what are called "grinders," to help prepare for examinations. On an average about 30 percent fail in the different classes A, B, C and D, as they are called. The entrance examination is also a great deal more difficult than it formerly was. It is simply a "grinders' college," without any authority to grant degrees. I believe the best veterinary school for English-speaking students is in Dublin. I lived in Ireland from May 1912 to July 1916 and I know the profession stands higher there than here. It is the same Examining Board for all the schools.

Richard Ebbitt, M.R.C.V.S.

Papillion, Nebr., May 25, 1923.

VETERINARY CONDITIONS IN THE NORTHWEST

To the Editor:—

Due to an extensive advertising campaign by railroads featuring the "Wonderland of America," which embraces the Northwest adjacent their railroads, the writer has received several inquiries from veterinarians in regard to conditions out here.

In the first place, this reading matter should be taken with large doses of sodium chloride. Advertising experts can take a large western desert, or a tract of land covered with burnt-over timber, and grow almost everything—on paper. The writer has traveled in every county in Washington, Idaho, most of Montana and Oregon, some of Utah and California, and the past fourteen years have taught him something about the scenic west.

It is true we have a beautiful country, and we would all be millionaires if we could live on scenery, but how many of the drawbacks are mentioned? In the first place, most of the good land has been taken up for many years. A man now taking a homestead on "dry land" or "virgin, burnt-over soil" is merely gambling with Uncle Sam, and the latter holding marked cards. Occasionally some hardy Scandinavian family, with a large bunch of hard-working children, carve out a good living, but it is at a terrific sacrifice.

Another thing to remember is our freight rates. We are so far from markets, and so many different phases enter into conditions, that it is amazing what the rancher is up against. Take, for instance, in southern Idaho, hay will sell for $6, and cannot be sold for any price at times. In northern Idaho, it may cost $24, due to high freight rates. In Idaho we have had over 65 bank failures the past two years. We have had only one good crop since 1917. We have had thousands of hard-working ranchers lose everything. Sheepmen went broke by the score, but that industry is coming back. Cattlemen wonder how long the banks will carry them.

Very little horse-breeding, and no price for horses, except good teams for lumber mills. In fact, the only thing that has paid any profit at all has been the dairy cow and the old hen. Last year, the apple growers were up against it on account of a certain railroad being unable to take care of their apples. With weather conditions, traffic conditions, financial conditions all upset, and our agricultural producers making less than a decent living, although working hard, another condition works against the veterinarian, and that is the automobile.

In the state of Washington, there are some 350 veterinarians registered; in Idaho almost 100. Only about half of these are in practice, and even they are only making a living. Small animal and dairy practice are the only paying branches at the present time. Veterinarians living in good agricultural centers, of course, have a fair mixed practice, but mighty few. Federal and state activities are numerous. The practitioner sees the best of work being done by salaried men.

Patent medicine vendors travel all over the country selling their unrivalled products to the horny-handed sons of toil, ranging from colic mixtures to sure cures for contagious abortion. College experts hand out free advice, and teach the laity how to "use the needle." County agents give free demonstrations on how to do your own veterinary work. The taxpaying practitioner, of course, pays his share for all these experts, and sees them doing what should be done by him in order to make a decent income.

It is western boosting literature that attracts the "suckers." Chambers of commerce from little towns send out glowing pamphlets that must make Ananias turn over in his grave. Instead of reading and absorbing these, write to some reputable veterinarian in the Northwest for his idea of correct conditions. Above all things, don't come out West, drop into some burg, get in the toils of the ever present real estate agent, and invest your hard earned savings until your tenderfoot days are over.

The West has its advantages and disadvantages, like every place else the writer has ever seen. To portray the dark side of practice as now found in the Northwest and to answer numerous questions, has been the aim of this article. State veterinarians in the Northwest who are conversant with conditions in their respective states are: Dr. L. C. Pelton, Olympia, Washington; Dr. Wendell R. Smith, Boise, Idaho; Dr. W. J. Butler, Helena, Montana; Dr. W. H. Lytle, Salem, Oregon.

The best way to find out actual conditions in any locality is to drop in quietly; keep away from the newspapers, and then engage in conversation with actual workers—not the loafers who populate Main Street and emit sage advice on how the President should run the country, but the average farmer, business man, professional man or in any other line of work. They will tell you, truthfully and frankly, their problems and the disadvantages of their community. They will not knock their home town, but they will not paint the rainbow. The longer you live in that town, the more you will find they have told you the truth. Remember

the average western town has never under-valued itself, and a typical western real estate agent is a combination of a hypnotist, good fellow, buckaroo, and very careless with the English language.

E. T. BAKER.

Moscow, Idaho, May 26, 1923.

Have You Secured One New Member This Year?

FLAT WARTS

TO THE EDITOR:

H. Fox, M. D., of New York, has recently published a report upon the treatment of human patients for flat warts, by the internal administration of mercurous iodid tablets, in doses of ¼ grain, three times daily for adults. In five out of ten cases treated, the warts disappeared in from three to eight weeks.

We hope some veterinarians will give this method of treatment a trial in treating warts on animals, and report in the Journal of the A.V.M.A.

N. S. MAYO

Chicago, Ill., May 22, 1923.

UNCLE SAM WIN'S SUIT

The U. S. Department of Agriculture recently conducted a successful prosecution, under the Pure Food and Drug Act, against the John Dobry Manufacturing Company, of Cedar Rapids, Iowa. This concern, for several years, has been marketing a fake hog cholera remedy, containing a few common drugs and a large amount of arsenic. The State of Iowa had previously brought suit against this concern, although unsuccessfully, for misbranding packages and making false statements.

Former editors of the Journal, and the present editor as well, have been criticised for allowing certain advertisements to appear in these pages. It sometimes happens that we can not be as particular, in certain respects, as we would like to be, in the matter of selecting and censoring advertisements. The fact remains, however, that so far as the present editor is concerned, our advertising pages will not be defaced with the ads of any chiropractic college.

MISCELLANEOUS

A NEW DEAN AT EAST LANSING

A long-hoped-for amalgamation of departments at the Michigan Agricultural College, which should substantially strengthen the Veterinary Division of that College, was consummated by a recent action of the State Board of Agriculture. By this action the academic and investigational work in parasitology, physiology, bacteriology and hygiene has been transferred to the Veterinary Division. Formerly these subjects have been administered either in the Agricultural or Applied Science Divisions.

DR. WARD GILTNER

Some time ago Dr. F. W. Chamberlain, who for the past four years has been Acting Dean, asked to be relieved of this duty. This request was granted and acknowledgment was made by the Board of its gratitude to him for his faithful services during this period.

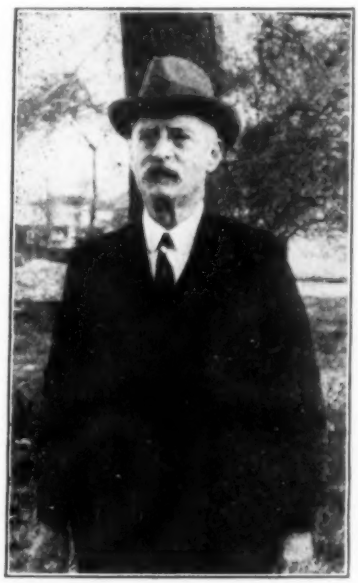
Under the amalgamation Dr. Ward Giltner, who has been

head of the Department of Bacteriology and Hygiene, since 1912, has been made Dean. Dr. F. W. Chamberlain will continue to head the Department of Comparative Anatomy.

The new arrangement should be instrumental in establishing a very close relationship between the allied divisions at the college. It should make for efficiency in investigational work in animal diseases, in that the work will be coordinated. Formerly part of this work was done by the Department of Animal Pathology, in the Veterinary Division, and part by the Department of Bacteriology and Hygiene, entirely without the Division. While the work given in parasitology and physiology will undoubtedly not be changed materially, it is felt that under the administration of the Veterinary Division that part of the work pertaining to veterinary science can be emphasized and developed.

Does Your Wife Know About The Women's Auxiliary?

MUCH IMPROVED



DR. W. H. DALRYMPLE

We are indebted to Dr. Harry Morris for the accompanying snap-shot of our good friend, Dr. W. H. Dalrymple. If there are any of his many friends who are wondering about the present state of his health, just take a look at the picture, which was forwarded under date of May 10th, with the word that Dr. Dalrymple's health was much improved. We think a trip to Montreal, about the latter part of August, is about the only further treatment to be prescribed in his case.

Have You Secured One New Member This Year?

NECROLOGY

SAMUEL BEATTY PATTERSON

Dr. S. B. Patterson died at his home in LaCrosse, Wisconsin, February 26, 1923, in his 59th year, after an illness of 13 days. The cause of death was lobar pneumonia.

In his early twenties Dr. Patterson became interested in veterinary medicine, and studied under Dr. W. P. Martin, of River Falls, Wis. The latter moved to La Crosse, in 1889, and Dr. Patterson accompanied him. Years later he entered the McKillip Veterinary College, and graduated in 1910, at the age of 46. He was associated in practice with his brother, Dr. G. W. Patterson.

Dr. Patterson was a member of the American Veterinary Medical Association, having joined in 1919. He was also a member of the Wisconsin Veterinary Medical Association. He was a member of the Yeoman, Ben Hur, Modern Woodmen and Masonic lodges. The funeral was conducted under Masonic auspices.

Well and favorably known in La Crosse and the surrounding territory, Dr. Patterson leaves a host of friends, many of whom can recall acts of kindness done them by the deceased, at various times in his useful life. He is survived by his brother, Dr. G. W. Patterson, two sisters and a niece.

CLAIRE NEWTON HACKETT

Dr. Claire N. Hackett, of St. Paul, Minn., died March 9th, 1923. The cause of death was heart trouble, with which he had been afflicted for several years.

Dr. Hackett was born near Tallmadge, Ohio, June 18, 1883. He attended common and high schools of his district, and received his veterinary training at Ohio State University, graduating in 1906. He married Augusta Wendorff, of Minneapolis, February 2, 1909, to which union one daughter, Gloria, was born.

Following graduation, in 1906, Dr. Hackett went to Minnesota, to accept a position as Field Veterinarian, for the Minnesota State Live Stock Sanitary Board, under the late Dr. S. H. Ward. One year later he entered the service of the Bureau of Animal Industry and was assigned to South St. Paul. In 1909 Dr.

Hackett spent the summer in Wyoming and Idaho, engaged in field work, returning to South St. Paul in the fall, when he was appointed Veterinary Inspector in the Union Stock Yards. In 1918 he was promoted to Supervising Veterinary Inspector, which position he held at the time of his death.

Dr. Hackett joined the American Veterinary Medical Association in 1917. He was also a member of the Minnesota State Veterinary Medical Association. He was ex-president of the South St. Paul branch of the National Association of B. A. I. Veterinarians. He was a member of Braden Lodge A. F. and A. M., and St. Paul Consistory No. 1. The funeral was conducted from the Masonic Temple and the body was laid to rest in Lakewood Cemetery, Minneapolis. Dr. Hackett was one of the most popular men connected with the South St. Paul Union Stock Yards, and every business concern in the city was represented at the funeral.

Dr. Hackett is survived by his widow, daughter, father, mother, and brother and one sister.

R. T. WHITTLESEY

Dr. R. T. Whittlesey, of Los Angeles, Cal., died May 1, 1923, at the age of 62 years. He was a native of New York State and as a small boy moved to Emporia, Kansas. He attended one session at the Montreal Veterinary College, then another at the Columbia Veterinary College, of New York City, from which institution he graduated in 1883. It is reported that Dr. Whittlesey, with his wife and three children, drove a span of mules and a covered wagon overland, when he went to California in 1884. He located in Los Angeles, where he continued to live, and practiced up until a few years ago, when he became the victim of locomotor ataxia. For some time previous to his death he was practically helpless.

Dr. Whittlesey was prominent in veterinary affairs of California for many years. He was at one time a member of the California State Board of Examiners in Veterinary Medicine. He was a member of, and served as President, both the California State Veterinary Medical Association and the Southern California Veterinary Medical Association. He joined the American Veterinary Medical Association in 1911.

H. H. CLEMENT

Dr. H. H. Clement died at his home, 215 Seward Street, Hudson, Mich., May 12, 1923. He had not enjoyed good health for some time. He was 64 years of age.

Dr. Clement graduated from the Ontario Veterinary College, in 1882. Of the forty years during which he was in active practice, 32 years were spent in Hudson. He was a charter member of the Michigan State Veterinary Medical Association. At the recent meeting of the Association, in February, Dr. Clement was made a life member, along with Drs. Brenton, Whitney and Dell, the latter of whom died about two months ago.

With the death of Dr. David Cumming, in January, Dr. J. A. Dell, in March, and Dr. Clement in May, three of the charter members of the Michigan State Veterinary Medical Association, organized in 1883, have been taken away during the present year.

Dr. Clement was a member of Lebanon Lodge, No. 26, F. & A. M., Phoenix Chapter, No. 99, R. A. M., and Putnam Council, No. 16, R. & S. M., of Hudson. He is survived by his widow, one daughter, one brother and two sisters.

DANIEL McCUAIG

Dr. Daniel McCuaig, of Ottawa, Canada, died May 26, 1923. Death was the result of a paralytic stroke.

Following his graduation from the Ontario Veterinary College, in 1892, he practiced in Ottawa for a few years and then moved to Moncton, New Brunswick, where he practiced until 1907. In that year he was appointed a Veterinary Inspector of the Health of Animals Branch, Department of Agriculture, Canada, and soon after this appointment was placed on the New Brunswick frontier, with headquarters at McAdam Junction, to enforce the regulations governing the importation of live stock from the United States. On account of ill health Dr. McCuaig was obliged to retire, October 1, 1922.

Dr. McCuaig joined the American Veterinary Medical Association in 1903. He always took a keen interest in the veterinary profession and attended several of the A. V. M. A. conventions at distant points in the United States. He was reserved and quiet in his manner, but was always a big-hearted veterinarian, ever ready to assist in anything that was for the betterment of his chosen profession. Dr. McCuaig is survived by his widow.

DR. I. I. SCHMIDT

In the June issue of the *Veterinary Journal* (London) announcement is made of the death of Dr. I. I. Schmidt, of Kolding, Denmark, the originator of the present successful treatment for milk fever of cattle. Dr. Schmidt was elected to honorary membership in the American Veterinary Medical Association in 1907.

We Want 5000 Members This Year.

ON THE SICK LIST

Dr. D. Henderson (Ont. '87), of Niagara Falls, Ont., has been very ill for over a year. He is now in a sanitorium and fears are expressed that he may not recover.

Dr. J. H. Tennent (Ont. '74), of London, Ont., is reported to be seriously ill with arterio-sclerosis.

Dr. M. E. Knowles (A. V. C.), of Helena, Mont., former President of the A. V. M. A., is also reported as being ill with arterio-sclerosis.

Dr. Samuel Brenton (Ont. '80), of Detroit, Mich., another former President of the A. V. M. A., has been quite ill, at his home, for several weeks. He contracted a heavy cold about the middle of May. At last reports he was doing nicely.

Dr. Robert Armstrong (Det. '97), also of Detroit, has been in the hospital for several weeks, on account of a serious illness, in connection with which it was found necessary to perform a serious operation.

Dr. James Drury (Ont. '91), of Ypsilanti, Mich., was recently a hospital patient, with a serious gastro-intestinal disturbance.

Plan To Go To Montreal, August 27-31.

BIRTHS

Dr. and Mrs. E. A. Horner, of Akron, Colo., a daughter, Mildred Elinor, March 29, 1923.

Dr. and Mrs. R. C. Mills, of Redfield, Iowa, a son, Clipper Eugene, March 26, 1923.

Dr. and Mrs. K. H. Gulser, of Adel, Iowa, a daughter, Shirley Jean, May 29, 1923.

Dr. and Mrs. F. W. Collins, of Madison, Nebr., a daughter, Clara Jean, April 5, 1923.

Dr. and Mrs. D. F. Studebaker, of Lucerne, Mo., a son, James Robert, March 18, 1923.

Dr. and Mrs. W. W. Pease, of Meadville, Pa., a son, Robert William, Jan. 8, 1923.

Have You Secured One New Member This Year?

MARRIAGES

Dr. Melvin R. Sebright (St. Jos. '16), of Crofton, Nebr., and Miss Sylvia Barbara Brandfas, of Hugo, Colo., at Omaha, Nebr., March 29, 1923.

Dr. H. T. Ludwig, (O. S. U. '13) and Miss Gladys Kope, of Louisville, Ky., June 2, 1923. At home, 2112 W. Broadway, Louisville, Ky.

Dr. Miller F. Barnes (U. P. '11), of Philadelphia, Pa., and Miss Elizabeth C. Lewis, of Broomal, Pa., June 2, 1923.

Does Your Wife Know About The Women's Auxiliary?

PERSONAL

Dr. Robert W. Pechin (U. P. '16) is Burgess of Pnoenixville, Pa.

Dr. H. S. Webber has been transferred from Jersey City, N. J., to Lancaster, Pa.

Dr. R. G. Kerans has left Kentucky and is again in practice at Leesburg, Ohio.

Dr. Jaime Bague (U. P. '14) is an officer in the Department of Agriculture of Porto Rico.

Dr. Curtis A. Fridirici (U. P. '21) has removed from Tamaqua, Pa., to Fogelsville, Pa.

Dr. John J. Shelly (U. P. '20) has changed his location from Stoney Run, Pa., to Hellertown, Pa.

Dr. N. J. Pearce (K. C. V. C. '13) has removed from Monticello, Ark., to Bentonville, same state.

Dr. Geo. E. Rothenberger has associated himself with the St. Lawrence Dairies, at Reading, Pa.

Dr. A. W. French has been appointed State Veterinarian of Wyoming, succeeding Dr. B. F. Davis.

Lt. Harry E. Van Tuyl (K. S. A. C. '17) has been transferred from Chicago, Ill., to Fort Ringgold, Texas.

Major Luis A. Beltran (U. P. '08), of the Cuban Army, has been transferred from Marianao to Havana.

Dr. John I. Handley (Ala. P. I. '13), of Atlanta, Ga., attended the recent Shriners' Convention, in Washington, D. C.

Dr. A. K. Zellner (Corn. '18), has succeeded Dr. L. V. Polk (Corn. '08) as chief veterinarian of the Dairymen's League.

Dr. Charles V. Pearce, of Coatesville, Pa., was recently bitten by a rabid dog and had to take the Pasteur treatment.

Dr. H. H. Collins (Chi. '17), of Elizabethtown, Pa., has been made Assistant City Meat and Milk Inspector ,of Reading, Pa.

Dr. Earl E. Romberger (U. P. '21) was recently appointed to the position of Chief Meat and Milk Inspector, of Reading, Pa.

Dr. W. P. Shoaff (Ind. '20) has removed from Weldon, Ill., to Paris, same state. His address is 224 E. Washington Street.

Dr. T. O. Scott (K. C. V. C. '12) has left Marlin, Texas, and located in Waco. He gives his address as 1915 Herring Ave.

Dr. M. M. Davis (McK. '15), has been transferred from Chicago, Ill., to South St. Paul, Minn. His new address is 334 Fourth Avenue, South.

Dr. E. T. Baker (Ohio '09), our ovine specialist, made a trip to the Pacific Coast, in April, as a member of the Moscow (Idaho) Elks Bowling Team.

Dr. Ralph W. E. Daniels (U. P. '21) has gone to the Pocono Mountains for the benefit of his health. His many friends wish him a speedy recovery from his illness.

Dr. L. E. Lyons (Ohio '11), has been transferred from Tallahassee, Fla., to Little Rock, Ark., where he is engaged in Tuberculosis Eradication work for the B. A. I.

Dr. H. J. Shore (Geo. Wash. '11), Laboratory Director of the Fort Dodge Serum Co., has been elected an honorary member of the Webster County (Iowa) Medical Society.

Dr. W. O. McHugh (Ont. '97), formerly at Cleveland, Ohio, has been transferred to Zanesville, Ohio, and is now in charge of meat inspection there. Address c/o Y. M. C. A.

Dr. Eugene Ferron (U. P. '14) who has been connected with the Department of Agriculture of Ecuador, S. A., has returned to this country and is making his home in Philadelphia.

Dr. J. W. Fuller (Corn. '21), who has been doing special work on poultry diseases, has resigned from the New York State Veterinary College to take up practice in connection with poultry diseases.

Dr. B. Scott Fritz (U. P. '17) has just received a promotion which necessitated his leaving Philadelphia, to go to Harrisburg, Pa., in connection with his work with the State Bureau of Animal Industry.

Dr. C. T. Higginbotham (Cin. '18) has been transferred from Hog Cholera Control work, in Nebraska, to the Meat Inspection Division, at Chicago. His address in the Windy City is 5057 South Ashland Avenue.

Dr. A. J. De Fossett (Ohio '07) has been transferred from Vermont to North Carolina, with headquarters at Raleigh. Dr. De Fossett made a splendid record in Tuberculosis Eradication work in the Granite State.

Dr. V. A. Moore was in Washington recently in conference with Drs. Mohler and Kiernan relative to the testing of cattle in Cattaraugus County, in cooperation with the efforts of the Milbank Memorial fund there.

Dr. H. W. Wilson (Chi. '15), our energetic Resident Secretary of Arkansas, recently took the Pasteur treatment, made necessary by coming into too close association with a canine patient, suspected of having "black tongue." It turned out to be rabies.

Drs. W. G. Hollingworth, of Utica, N. Y. and E. V. Moore (Corn. '17), of Cortland, N. Y., gave addresses on practical phases of veterinary practice before the students of the New York State Veterinary College, during the months of April and May.

Dr. George W. Rawson (U. S. '16) recently completed a year's course of study in post-graduate work, at Johns Hopkins University, and has accepted a position in the Department of Animal Industry of Parke, Davis & Company, with headquarters at Detroit.

Dr. Carl Viers (St. Jos. '14) was recently elected Mayor of Vermillion, South Dakota. Besides being Mayor and a busy practitioner, Dr. Viers is President of the Shrine Club, Worthy Patron of the Eastern Star and Master of the Masonic Lodge of Vermillion.

Capt. Raymond A. Kelser (Geo. Wash. '14) received the degree of Doctor of Philosophy, at the ninth Convocation of the American University, Washington, D. C., May 29, 1923. The subject of Capt. Kelser's thesis was "A Study of Rabies from the Standpoint of Etiology and Diagnosis."

Dr. John B. Knapp (Corn. '02), of Cortland, N. Y., was elected chairman of the organization of veterinarians of Cortland County at their meeting held June 6th. It was decided to hold monthly meetings for the purpose of discussing subjects of common interest to the profession and live stock owners of the country.

Dr. Carlton J. Morgan (Corn.) has recently been appointed Dairy and Food Inspector for the Department of Public Health and Vital Statistics, City of Kenosha, Wisconsin. Before accepting the above-mentioned position Dr. Morgan was Food Inspector in the Bureau of Animal Industry, at Somerville, Massachusetts.

Dr. L. H. Smith (Ohio '15), for eight years Field Veterinarian with the Ohio Department of Agriculture, and more recently in charge of abortion and sterility work in the herds connected with Ohio's various institutions, has accepted a position with the Detroit Creamery Company, and will have charge of the veterinary work in connection with their certified herd of 800 head, at Ingleside Farm, near Mt. Clemens, Mich.

Dr. H. J. Metzger (Corn. '18) veterinary extension specialist in the Department of Animal Husbandry, New York State College of Agriculture, at Cornell University, is spending a month at the University of Wisconsin. His object is to secure first-hand information relative to the methods of conducting, and results secured from, the research work with animals, which is being carried on in the Wisconsin College of Agriculture. He will spend the major portion of his time with the Departments of Agricultural Chemistry and Veterinary Science.

Dr. Earl A. Hewitt (Iowa '18), Instructor in Veterinary Physiology, at the University of Minnesota, has just been honored by election to Sigma Xi, in recognition of his research work in the field of physiology and physiological chemistry, particularly his work on the elimination of hippuric acid by the kidneys. Dr. Hewitt received his A. B. from DesMoines University, in 1914; his B. S. from Iowa State College, in 1915; and his D. V. M. from the same institution, in 1918. He was elected to Phi Kappa Phi the same year. He has been at the University of Minnesota since the fall of 1919.

Dr. John T. E. Dinwoodie (U. P. '13) has been appointed editor of The Dakota Farmer, one of the leading agricultural papers of the Northwest. Dr. Dinwoodie was a member of the Veterinary Staff of the University of Minnesota for several years after his graduation from the University of Pennsylvania, engaged in hog cholera work. He then went to the South Dakota Agricultural College, as Extension Specialist in Animal Disease Control. In 1918 he joined the staff of The Dakota Farmer as live stock editor. Three years later he was made associate editor. Dr. Dinwoodie's word goes a long way with the live stock interests in South Dakota.